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REPORT OF THE
DEFENSE SCIENCE BOARD
TASK FORCE
ON
DEPOT MAINTENANCE
MANAGEMENT

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94-11858



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Security review completed 30 March 1994 by OASD (Public Affairs) directorate for Freedom of Information and Security Review Case number 94-S-1218.

REPORT DOCUMENTATION PAGE			
1a REPORT SECURITY CLASSIFICATION Unclassified		1b RESTRICTIVE MARKINGS N/A	
2a SECURITY CLASSIFICATION AUTHORITY N/A		3 DISTRIBUTION/AVAILABILITY OF REPORT Distribution Statement A Approved for Public Release: <u>Distribution is Unlimited.</u>	
2b DECLASSIFICATION/DOWNGRADING SCHEDULE N/A		5 MONITORING ORGANIZATION REPORT NUMBER(S) N/A	
4 PERFORMING ORGANIZATION REPORT NUMBER(S) N/A		6a NAME OF PERFORMING ORGANIZATION Defense Science Board, Ofc of the Under Secy of Def (A&T)	
6c. ADDRESS (City, State, and ZIP Code) The Pentagon, Room 3D865 Washington, DC 20301-3140		6b OFFICE SYMBOL (If applicable) DSB/OUSD (A&T)	
8a. NAME OF FUNDING/SPONSORING ORGANIZATION Defense Science Board, OUSD (A&T)		8b OFFICE SYMBOL (If applicable) DSB/OUSD (A&T)	
8c. ADDRESS (City, State, and ZIP Code) The Pentagon, Room 3D865 Washington, DC 20301-3140		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER N/A	
11 TITLE (Include Security Classification) Report of the Defense Science Board Task Force on Depot Maintenance Management, Unclassified.		10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO N/A	
12. PERSONAL AUTHOR(S) N/A		PROJECT NO N/A	
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM N/A TO N/A	
14. DATE OF REPORT (Year, Month, Day) 1994 April		15. PAGE COUNT 257	
16. SUPPLEMENTARY NOTATION N/A			
17. COSATI CODES FIELD GROUP SUB-GROUP		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
19. ABSTRACT (Continue on reverse if necessary and identify by block number)			
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION	
22a. NAME OF RESPONSIBLE INDIVIDUAL Diane L.H. Evans		22b. TELEPHONE (Include Area Code) (703) 695-4157/8	
22c. OFFICE SYMBOL DSB/OUSD (A&T)			



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BOARD

OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301-3140

31 MAR 1994

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE (ACQUISITION & TECHNOLOGY)

SUBJECT: Report of the Defense Science Board (DSB) Task Force on Depot Maintenance Management

I am pleased to forward the final report of the DSB Task Force on Depot Maintenance Management, which was chaired by Mr. Robert N. Parker. The Task Force was convened in response to Section 341 of the National Defense Authorization Act for Fiscal Year 1994. The Task Force was to assess the overall performance and management of depot-level activities of the Department of Defense while addressing nine specific Congressionally mandated tasks.

The Task Force developed a detailed list of findings which are documented in the report. They reaffirm the importance of depot maintenance in DoD's ability to support materiel readiness and sustainability requirements of the war fighters. The findings highlight the need to establish a rational balance between public and private sector depot maintenance support and the continuing need to reduce excess capacity.

The Task Force has developed legislative and administrative recommendations which I fully support. The recommended legislative action to replace the "60/40" restriction with the CORE concept is critical for the management of depot maintenance within the Department. I also support a stronger Defense Depot Maintenance Council.

While recognizing the divergent Air Force view, I believe, given that the remainder of the Task Force was in unanimous agreement regarding the findings and conclusions, it is appropriate to move forward to implement the recommendations. I recommend that you forward the report to the Secretary of Defense.

Paul G. Kaminski
Paul G. Kaminski
Chairman



DEFENSE SCIENCE
BOARD

OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301-3140

31 MAR 1994

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Report of the Defense Science Board (DSB) Task Force on Depot Maintenance Management

Attached is the report of the DSB study on Defense Depot Maintenance Management. The study was conducted in response to the Fiscal Year 1994 National Defense Authorization Act. The Terms of Reference for the DSB Task Force required that it address nine specific Congressional tasks and make recommendations for appropriate administrative and legislative actions. Two additional tasks that are not required by legislation will be addressed by the Task Force and an addendum to the Report will be forwarded in June 1994.

To gain the benefits of advice from both the government and industry, a large Task Force of very senior representatives of both sectors was assembled. Appendix B of the report identifies the forty-one Task Force members. Four Task Force panels were formed to address unique depot maintenance commodity considerations. The Task Force considered the full range of depot maintenance issues including the balance of workload between public and private sectors; how that balance is achieved; the rationale for maintaining Service maintenance depots, and the appropriateness of competition as a management tool to determine workload sources of repair.

The Task Force found that Service Secretaries Title 10 readiness responsibilities require that the Services retain control over their CORE depot capabilities while recognizing the need for interservicing where efficiencies dictate. We found a very real need to continue depot maintenance infrastructure downsizing. The Task Force agreed that eliminating infrastructure is key to real cost savings for the Department. The entire Task Force, except the Air Force members, agreed that the depots should not engage in competition with the private sector or with other Service depots. While the Task Force identified a multitude of reasons that public sector depots should not engage in competition, two most fundamental reasons were that current DoD accounting systems are not adequate to determine real costs in support of the competition process and, that efficiencies can be obtained through private-private competitions. The entire Task Force agreed that major modifications and upgrades should primarily be accomplished in the private sector.

The major legislative recommendation of the Task Force is to replace the current "60/40" legislation with a concept consistent with CORE implementation. There were a number of administrative action recommendations including complete implementation of CORE policy, improving financial management systems within DoD, and further strengthening the Defense Depot Maintenance Council to effectively address vital depot maintenance issues.

You should be aware that the Air Force representatives to the Task Force, while agreeing with most of the Task Force findings and recommendations have taken exception in two areas. These are the Task Force recommendation for Service specific CORE, and the recommendation to discontinued DoD maintenance depot participation in competition. On both of these the remainder of the Task Force was in complete agreement with the recommendation. I reviewed the Air Force minority position and believe that the Task Force report as written reasonably considers and represents their position.



Robert N. Parker
Task Force Chairman

Attachment

PREFACE

This study, undertaken to meet the requirements of the Secretary of Defense and Section 341 of the FY 1994 National Defense Authorization Act, addresses the specific taskings to the Defense Science Board Depot Maintenance Management Task Force.

This submission addresses, in the report and its appendices, all nine Congressional tasks of the Terms of Reference and provides recommendations for appropriate Legislative and Administrative actions.

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REPORT OF THE DEFENSE SCIENCE BOARD TASK FORCE ON DoD DEPOT MAINTENANCE MANAGEMENT

OVERVIEW

The Depot Maintenance Management Task Force was convened in response to Section 341 of the National Defense Authorization Act for Fiscal Year 1994. The Task Force effort is a follow-on to earlier Department of Defense reviews of depot maintenance undertaken in conjunction with recent force structure changes. The Terms of Reference (TOR) for the current study outlined nine specific Congressionally-mandated tasks and required the Task Force to submit appropriate recommendations for legislative and administrative actions. Each of the nine tasks is addressed in this report or the attached appendices.

To gain the benefits of advice from both the government and industry, a large Task Force of very senior representatives of both sectors was assembled. Membership included defense industry corporate executives and senior operating officers as well as senior DoD logistics commanders and executives. Appendix B identifies the forty-one Task Force members. In comprising the Task Force in this manner, the Defense Science Board benefited from a wide range of backgrounds and depth of experience. Four Task Force panels were formed to address unique depot maintenance commodity considerations.

Depot maintenance is accomplished using a balance of public sector (organic) maintenance depots and private sector (commercial) firms. There are significant differences in how organic depots and private sector firms are structured. Original equipment manufacturers (OEMs) usually have large staffs for engineering, research and development, marketing and other functions. OEMs typically have the highest overhead costs and are heavily facilitated. Organic depots are also heavily facilitated and are often large-scale, integrated industrial activities with the capability and capacity for multiple commodities. On the other end of the spectrum are private sector services companies that are specifically organized to have minimum overhead. These services companies do not maintain large indirect staff units, nor do they have large

sunk costs in facilities and equipment that must be depreciated or amortized in their cost structure.

Organic depots exist to support the readiness and sustainability requirements of United States combat forces. It is essential that DoD maintenance depots provide flexible and responsive depot maintenance support capabilities in consonance with Service Secretaries' Title 10 readiness responsibilities. The Task Force supported this vital role of the DoD organic depots, agreeing that there is an irreducible minimum of depot maintenance capability that must be provided by organic depots. These capabilities, defined as CORE, comprise skills, competencies and facilities that must exist in organic depots and shipyards. CORE requirements are derived by each Service in an analytical manner as support requirements related to current military strategies (e.g., force structure and the Joint Chiefs of Staff two major regional conflict scenario). The Task Force agreed that the CORE concept is the correct approach to derive essential organic depot maintenance capabilities, and all but the Air Force agreed that it is a vital role of each Service to provide for the organic depot support of its CORE capabilities.

Given recent changes in force structure and military strategies, both DoD and the private sector have excess unutilized depot maintenance capacity. The costs associated with carrying this excess capacity, while not expressly determined, are known to be significant. DoD is most concerned with minimizing the total cost of essential depot maintenance support, whether that support is provided by the public or private sector. The Task Force agreed that divestiture of excess organic infrastructure is a key element of reducing overall depot maintenance costs. There was also agreement that there are industrial base considerations that must be taken into account as both sectors continue to downsize, and that in some cases, certain depot maintenance workloads could contribute to the preservation of needed industrial base capabilities.

In agreeing that depot maintenance costs needed to be minimized, consistent with readiness and sustainability requirements, the Task Force found that some current approaches to cost minimization may be inappropriate, if not ineffective. Competitions between organic depots and the private sector as well as among the organic depots do not appear consistent with current Department goals and policies. While Congress has granted the DoD depot maintenance community authority to compete with the private sector, it was intended that such programs be full and fair competitions. Unbridled competition between the public and private sectors is inconsistent with the basic tenet

that government exists to provide the essential services that the private sector either cannot or will not provide. The Task Force perceived that competitions involving the organic depots are having disruptive and divisive effects on the Services, particularly on the depot maintenance community. Further, given that DoD is moving to size its organic maintenance capabilities consistent with its CORE policy, it is questionable whether additional capacity and resources should be retained in order to compete.

To most effectively control depot maintenance costs, rather than expending resources to compete, DoD should focus on sizing its depots consistent with the CORE concept, divesting unneeded and expensive excess capacity and infrastructure, and managing remaining operations in the most efficient manner. These activities, overseen by the Defense Depot Maintenance Council (DDMC), will result in effective depot maintenance support to combat commanders, the proper balance between the public and private sectors, and cost-effective depot maintenance operations.

The essential cooperation necessary between Services and between the DoD and its industry partners is being eroded by recent competition programs as the inherent trust that previously existed is disappearing. Industry questions, as do some of the Services when contemplating both public-private and public-public (depot against depot) competition, whether a level playing field for such competitions can ever be established. Given that the Services readily admit that cost visibility and accuracy are deficient, it may not be possible to have fair and meaningful competition or to effectively evaluate the results of such efforts.

It should be noted that the above points reflect the full Task Force views, less the Air Force. The Air Force position is that public-private and public-public competitions are an appropriate avenue to achieve cost reductions and that the results of such competitions should be a primary determinant of the size and structure of the organic depot infrastructure. The Air Force view is that the provision of CORE capabilities, once derived by the Services, should be viewed from a composite DoD perspective rather than being capabilities retained specifically under the direct control of each military service. These positions were not supported by the remainder of the Task Force.

TASK FORCE FINDINGS

Consistent with the above overview, the Task Force Findings are:

- ♦ **Readiness, sustainability and total life-cycle support are the primary reasons for organic depots.**
- ♦ **Service Secretaries' Title 10 readiness responsibilities require Service depots to provide Service CORE capabilities.**
- ♦ **The basic CORE concept is valid – it is supported by DoD and Industry Task Force members.**
- ♦ **Legislative constraints such as "60/40"¹ are not consistent with CORE policy implementation – other legislative guidance also impacts CORE.**
- ♦ **There is excess depot maintenance capacity in the public and private sectors . . .**
 - **Downsizing consistent with CORE concept will minimize organic infrastructure and reduce excess capacity.**
 - **Reintroduction of the depot maintenance capacity of closed facilities into the industrial base could have detrimental effects on the base.**
 - **Policy consistent with CORE concept required for management of workload transitions between public and private sectors.**
- ♦ **Depot maintenance workload is particularly critical for private shipyard industrial base.**
- ♦ **Major modifications and upgrades are most appropriately accomplished in the private sector.**
- ♦ **Public-private competition is counter-productive for DoD and private sector.**
- ♦ **Interservicing of depot maintenance work for common systems is preferable to public-public competition.**
- ♦ **Common systems for collecting and displaying costs of public and private sector work are needed to support effective business management.**
- ♦ **Empowered Defense Depot Maintenance Council management of depot maintenance is appropriate; must be provided the structure and authority to implement policy and decisions.**

¹The public-private workload balance resulting from current legislation that requires that not less than 60 percent of depot maintenance work be accomplished by Federal government employees.

TASK FORCE RECOMMENDATIONS

The Task Force identified legislative and administrative actions consistent with these findings. The recommendation for legislative action focuses on changing current legislation affecting workload balance between the public and private sectors. The recommendations for administrative actions center on effective implementation of the CORE policy and continued management improvements.

Legislative action --

- ♦ Replace "60/40" and other legislative restrictions with a concept consistent with CORE policy.

Administrative actions --

- ♦ Fully implement CORE policy to replace current workload split with a balance of validated minimum Service CORE workload requirements in public depots and non-CORE workload in the private sector ...
 - Eliminate public-private and public-public competition.
 - Size organic depot maintenance capacity to CORE requirements.
 - Selected non-CORE workload may be assigned to maintain private sector industrial base capabilities as appropriate.
 - Compete (private-private) remaining non-CORE workload.
- ♦ Aggressively pursue financial management initiatives to provide for better management of the depot maintenance business area.
- ♦ Design, develop, manufacture and, generally, install major modifications and upgrades in the private sector.
- ♦ Further strengthen the Defense Depot Maintenance Council to ...
 - Monitor full implementation of CORE policy.
 - Implement other policies recommended herein.
 - Develop future policy recommendations.
 - Oversee depot maintenance operations (e.g., efficiencies, capital investments and interservicing of workload).

BACKGROUND

As a part of the overall post-Cold War downsizing, and in response to declining budgets, DoD has carefully examined the functional area of depot maintenance to guide decisions on downsizing related infrastructure. In 1992 the Joint Chiefs of Staff (JCS) commissioned a study of depot maintenance management to complement their review of DoD roles and missions. The JCS study recommended establishing a Joint Depot Maintenance Command to manage the Department's depot maintenance operations. The Secretary of Defense did not adopt this recommendation, but rather directed further review of depot maintenance management options. That review looked at the need for integrated management of DoD depot maintenance. Two of the key recommendations of the review are being implemented -- the empowering of the Defense Depot Maintenance Council (DDMC) and the concept for identifying essential maintenance capabilities -- to be collectively known as "CORE" -- which will be retained in DoD organic depots. In anticipation of the Congress directing the establishment of the current Task Force to review depot maintenance issues and management, implementation of additional recommendations from the previous study was deferred.

The examinations discussed above reaffirmed the importance of depot maintenance in DoD's ability to support materiel readiness and sustainability requirements for JCS contingency scenarios. Further, they highlighted the need to establish a balance between public and private sector depot maintenance support that provides acceptable risk at an affordable price.

The magnitude of depot maintenance downsizing remaining to be achieved is, in large part, related to two factors: total depot maintenance workload and workload balance between the public and private sectors. Total depot maintenance workload depends on the relatively predictable support requirements driven by the prevailing military strategy. However, the distribution of that workload -- balance -- between the public and private sectors depends largely on policy and legislation. For example, existing legislation requires at least 60 percent of depot maintenance work to be accomplished by Federal government employees. Previous DoD policy for workload distribution used a decision logic process based on massive mobilization requirements. The large scale, full mobilization scenarios required DoD to maintain substantial public sector depot maintenance capacity and capability. Although there have been

significant reductions in manpower, much of the large depot maintenance infrastructure still exists today. Current policy defines the CORE concept. Implementation of the policy is ongoing as the Services identify the capabilities required, relate those capabilities to workload and take steps to size their organic infrastructure accordingly.

In order to ensure retention of adequate capability to maintain mission essential weapon systems, a methodology has been established that relates required depot maintenance capabilities to JCS contingency scenarios. This methodology focuses on determining the depot maintenance capability required in DoD organic depots -- the CORE concept. CORE capabilities and requisite workloads (i.e., support for mission essential weapons systems), by definition, must be maintained in DoD depots. This methodology recognizes, however, that some depot maintenance support for mission essential weapon systems can logically exist outside of DoD depots -- in the private sector. Emerging results of Service calculations of required CORE capabilities indicate that only 40-50 percent of the total peacetime depot maintenance workload will be needed in the organic depots to maintain CORE. As noted above, current law requires that at least 60 percent of the peacetime workload be accomplished by government employees.

As part of a continuing Congressional interest in depot maintenance, Section 341 of the 1994 National Defense Authorization Act directed the Secretary of Defense to establish a Defense/Industry Task Force "to assess the overall performance and management of the depot-level activities of the Department of Defense." The Task Force is required to address the following nine specific tasks:

- (1) The identification of the depot-level maintenance workloads that were performed during each of fiscal years 1990 through 1993 for the military departments and the Defense Agencies by employees of the Department of Defense and by non-Federal Government personnel.
- (2) An estimate of the current capacity to carry out the performance of depot-level maintenance workloads by employees of the Department of Defense and by Non-Federal Government personnel.
- (3) An identification of the rationale used by the Department of Defense to support a decision to provide for the performance of a depot-level maintenance workload by employees of the Department of Defense or by non-Federal Government personnel.

(4) An evaluation of the cost, manner, and quality of performance of the depot-level maintenance workload by employees of the Department of Defense and by non-Federal Government personnel.

(5) An evaluation of the manner of determining the CORE workload requirements for depot-level maintenance workloads performed by employees of the Department of Defense.

(6) A comparison of the methods by which the rates and prices for depot-level maintenance workloads performed by employees of the Department of Defense are determined with the methods by which such rates and prices are determined for depot-level maintenance workloads performed by non-Federal Government personnel.

(7) A discussion of the issues involved in determining the balance between the amount of depot-level maintenance workloads assigned for performance by employees of the Department of Defense and the amount of depot-level maintenance workloads assigned for performance by non-Federal Government personnel, including the preservation of surge capabilities and essential industrial base capabilities needed in the event of mobilization.

(8) An identification of the depot-level functions and activities that are suitable for performance by employees of the Department of Defense and the depot-level functions and activities that are suitable for performance by the non-Federal Government personnel.

(9) An identification of the management and organizational structure of the Department of Defense necessary for the Department to provide the optimal management of depot-level maintenance and the allocation of related resources.

The appendices to this report provide comprehensive Task Force assessments for each of the first eight tasks. Task nine, dealing with organizational structure and management of depot maintenance, is addressed in the body of this report.

READINESS AND SUSTAINABILITY – FOUNDATION FOR DoD DEPOT MAINTENANCE

Flexible and responsive depot maintenance contributes significantly to the operational readiness and sustainability of United States combat forces. It is essential for national defense that Department of Defense activities maintain a logistics capability (including personnel, equipment and facilities) to ensure a ready and controlled source of technical competence and resources necessary to ensure effective and timely response to a mobilization, . . . contingency, . . . or other emergency

requirement.² The Military Services train and equip their forces, and maintain them in a state of readiness to ensure that they are fully prepared for immediate and sustained combat. In order to make certain that critical mission-essential weapons are always ready, and to ensure responsive support, Service Secretaries provide the combatant commanders with access to a ready and controlled source of critical depot maintenance capability needed to fight and win. The ability to *guarantee* delivery of flexible and responsive depot maintenance support for these systems represents the essence of DoD's depot maintenance mission -- it is *the reason that the government maintenance depots and shipyards exist*. The capability to effectively support and maintain modern, high technology weapon systems is a perishable resource; it must be constantly exercised throughout the life cycle of the weapon systems in order to remain robust.

In peacetime, Service depots maintain critical capabilities by performing depot maintenance work on weapons and equipment that will be used in JCS contingency scenarios. The Task Force agrees that these contingency-related readiness and sustainability requirements are the primary reason for maintaining organic maintenance depots. Further, the Task Force is convinced that the size of the organic maintenance depot infrastructure should be driven by the need for capabilities related directly to these requirements. Such sizing, when balanced with private sector capabilities and support, will result in an efficient and economic overall depot maintenance support structure. There are no functional or technical reasons for a pre-existing bias toward either the public or private sector in the support of mission essential weapon systems; both sectors provide reliable support of mission essential weapon systems and equipment.

DEPOT MAINTENANCE BUSINESS BASE

Data developed for the Task Force by the Services indicates that depot maintenance has been a \$15 billion per year business over the past five years. This amount includes some executed programs that have not routinely been included in less comprehensive characterizations of the depot maintenance business base. The content

² Title 10, United States Code, Chapter 146, Section 2464

of the business base was intended to be inclusive of all workload performed and, therefore, the public sector content includes

- all work accomplished at maintenance depots, regardless of level, and including modifications and upgrades
- all costs including direct, indirect and overhead costs, salaries, material and parts, utilities, depreciation, capital investment, facility repair and support services
- depot maintenance workload from all funding sources, not just that funded from depot maintenance program appropriations
- depot work accomplished at government facilities primarily devoted to other purposes
- work at non-Defense Business Operations Fund (DBOF) depot maintenance facilities, and

Additionally, contract depot maintenance administered directly by program managers is also included. About 70 percent of the \$15 billion depot maintenance business has historically been accomplished in the DoD organic depots with the remainder being accomplished by private sector commercial firms. Figure 1 depicts the FY 1993 total depot maintenance business base by Service and source of repair (public or private).

DoD organic depots include air logistics centers, naval aviation depots, naval shipyards, Marine Corps logistics bases, Army depots, and other similar activities. Segments of the private sector involved in depot maintenance include original equipment manufacturers (OEMs), private shipyards, vendors, and maintenance services companies. Appendix C and Appendix D provide detailed data on DoD depot maintenance workloads and related organic and industry capacity. It should be noted that in providing the data on past completed DoD workloads, the Department had to resort to data calls rather than being able to rely on a single integrated and comprehensive data base. This raises the issue of data comparability, although all inputs were compiled, validated and provided by the individual Services.

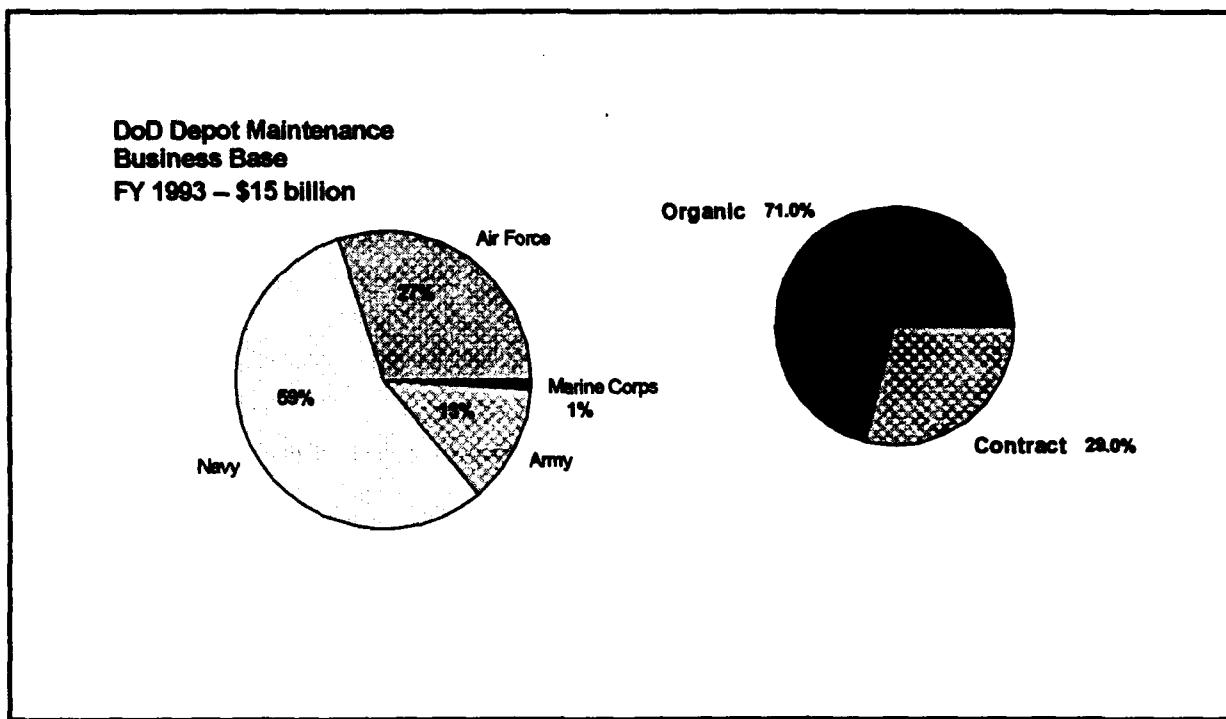


Figure 1. FY 1993 Depot Maintenance Business Base

The Task Force considered depot maintenance workloads in six major commodity areas.³ Figure 2 depicts the DoD total depot maintenance workload in these six areas over the past four fiscal years. Workload in each of these commodity areas has been remarkably stable over that period. For example, fixed wing aircraft workload varies from 29-31 percent, communications-electronics from 13-14 percent, and ships from 37-39 percent of total costs. The aviation share (fixed wing and helicopter) averages about 37 percent, while the ships share averages about 38 percent of all work; they dwarf all other workload categories which together total to the remaining 25 percent. It is important to note that in then-year dollars, the depot maintenance business base has remained relatively stable in the face of declining DoD budgets, indicating that an increasing share of the Defense budget is being directed to depot maintenance at the expense of other key program elements.

³Although there were four Task Force commodity panels, workload was further divided to provide additional visibility for helicopters and missiles.

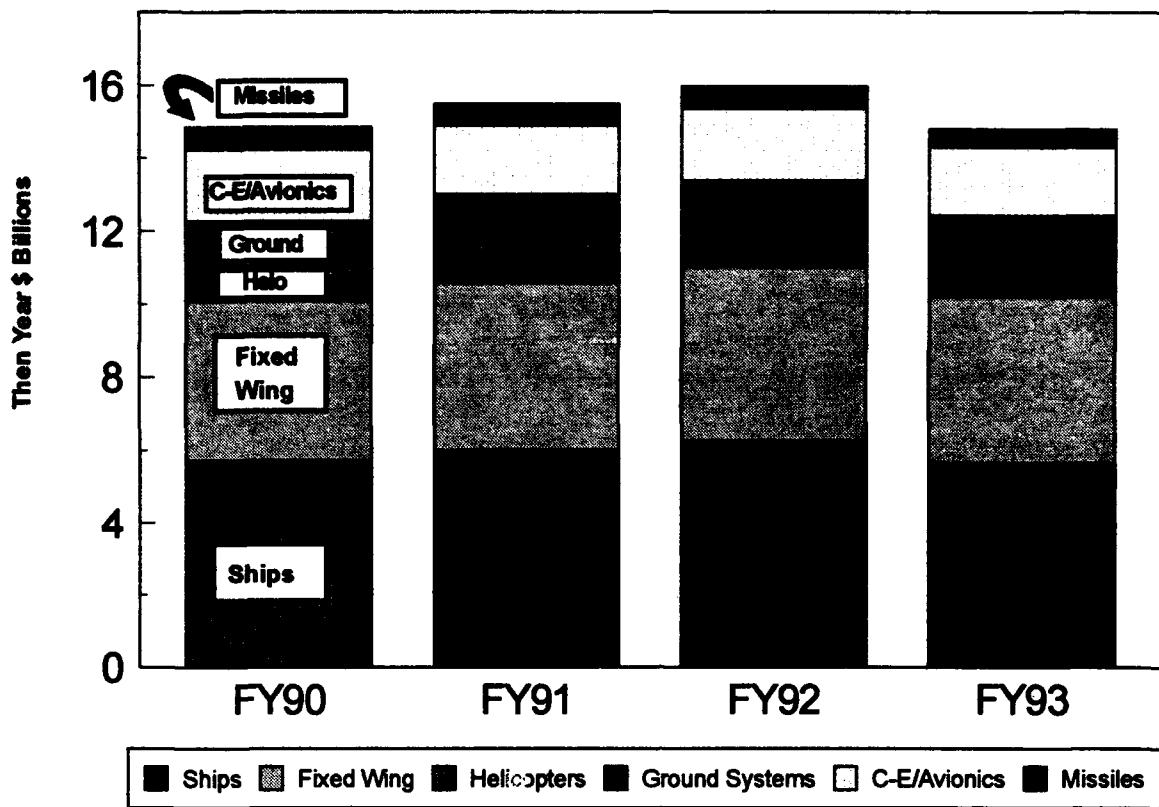


Figure 2. FY 1990 - FY 1993 Depot Maintenance Business Base Break-out

MANAGING DOD DEPOT MAINTENANCE

In 1993, DoD took a critical look at the management structure in place for the Department's depot maintenance operations. Several alternative management structures were considered, ranging from a single depot maintenance command or agency to executive Service management on a commodity-type basis. The review concluded that in light of ongoing downsizing, force structure reductions, and business process changes, integrated management of DoD depot maintenance was indeed appropriate with Services retaining functional responsibility for the accomplishment of depot maintenance. The review recommended adding responsibilities to the established DDMC as the most effective manner to bring about the degree of integration necessary. To that end, the Deputy Secretary of Defense approved retaining the DDMC as the primary vehicle for oversight of depot maintenance within the Department. The DDMC was empowered to expand its focus to encompass all depot

maintenance operations and issues, e.g., elimination of excess capacity and interservicing of depot maintenance work among the Services.

The current Task Force agrees that a strengthened DDMC is the most appropriate management alternative. This alternative will allow DoD to ensure successful implementation of policies such as CORE without constraining Service Secretaries' abilities to fulfill their Title 10 responsibilities. Additionally, the DDMC should serve as the forum for oversight of depot maintenance operations such as capital investments and interservicing and should recommend future depot maintenance management policy. To most effectively implement the changes needed to meet fiscal and readiness challenges, the Task Force specifically recommends that policies be established for increased depot maintenance resource management flexibility.⁴

Public and private sector depot maintenance managers use similar processes to set their rates and prices. Similar accounts detail most expense elements. There are some basic cost differences between the two sectors, (e.g., profits, taxes, cost of money, insurance, military-related costs and mobilization). While accounting systems of the two sectors are based on the same principles and standards, some adjustments to cost specifics are required in making cross-sector comparisons. Task Force members recognized that DoD is working to enhance accounting practices, performance measures, and information systems for depot maintenance within the larger framework of Department-wide business processes and corporate information management changes. They agreed that common systems for collecting and displaying depot maintenance cost information are needed to support effective business management and decision making. Industry Task Force members believe that valid and meaningful cost comparisons between the public and private sectors are not currently possible. There is no conclusive evidence, however, that one sector or the other is inherently less expensive. Appendix H provides a detailed discussion of public and private sector rates and prices as they relate to depot maintenance.

⁴These resources include depot maintenance personnel and funds.

MAJOR MODIFICATIONS/UPGRADES TO THE PRIVATE SECTOR

Depot maintenance operations include a wide spectrum of activities such as overhaul and repair of components, programmed depot maintenance for entire weapon systems including hardware and software for ships, aircraft and tanks, modification and upgrade of systems and equipment, and, when required, battle damage repair. There was no evidence found that any of these activities is better suited to performance by either the public or private sector, although some seem to be intrinsically linked to one sector or the other. However, there was universal agreement among the Task Force members that major modifications and upgrades should be performed primarily in the private sector. This workload is unique among depot activities in the sense that it uses many of the same capabilities required by the commercial defense industry to design, develop and produce new weapon systems. For this reason, modification and upgrade work provides the greatest potential to contribute to preservation of these essential skills in the Defense private sector industrial base. A more detailed discussion of this subject is contained in Appendix I.

Modifications and upgrades are not, by definition, part of depot maintenance CORE.⁵ The government has traditionally obtained development and manufacture of kits for modifications and upgrades from the private sector. However, installation of the kits has been done in both public and private facilities. As indicated above, the Task Force concluded that major modifications and upgrades should be principally supported in the private sector with organic depots installing kits and upgrades only when there is not adequate workload to sustain a required CORE capability or when such work can be accomplished concurrently (and most cost effectively) with CORE workload. For example, when an aircraft or ship is brought into a maintenance depot for periodic maintenance, extensive disassembly is accomplished for inspections providing an opportune time to install modification kits if needed.

⁵There is no link between modification and upgrade workloads and JCS scenario readiness support.

EXCESS DEPOT MAINTENANCE CAPACITY EXISTS IN BOTH PUBLIC AND PRIVATE SECTORS

Just a few years ago DoD had 35 major organic maintenance depots.⁶ Through streamlining efforts and management actions, and in support of Base Realignment and Closure (BRAC) initiatives, the number of DoD depots to remain open has been reduced to 24. Other actions have been taken to reduce DoD organic capacity such as reducing work forces and eliminating maintenance depot buildings and work centers. Similarly, industry has downsized by eliminating facilities and cutting work forces.

Figure 3 shows the Services' current plans to continue reducing organic depot maintenance capacity. However, since planned organic workload continues to decline, substantial unneeded capacity will remain in some Services. Implementation of the CORE concept will further reduce requirements for workload to be in organic depots and thereby add to the unneeded capacity and infrastructure problem. It is anticipated that additional Service actions to downsize will be needed to address this excess capacity situation.

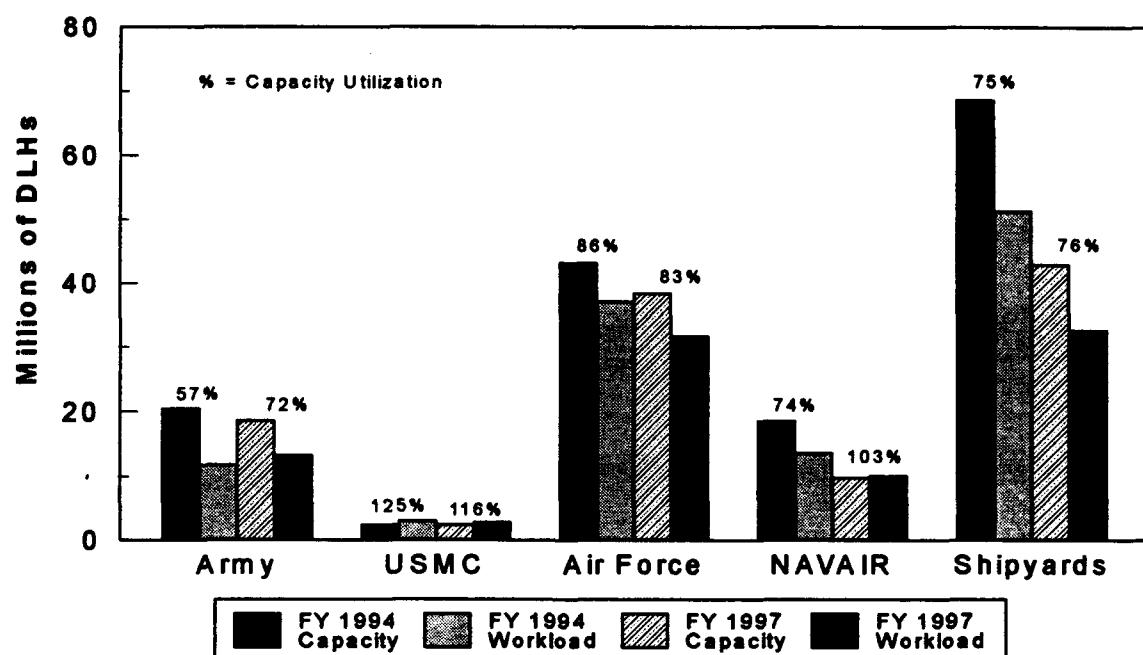


Figure 3. DoD Organic Maintenance Depot Capacity and Utilization

⁶A major maintenance depot is defined as having 400 or more employees.

Even with ongoing reductions, both DoD and industry will still have excess unutilized capacity. Figure 4 shows current industry capacity and workloads in six major depot maintenance commodity areas. The industry workload depicted includes both depot maintenance work as well as production work, but the capacity shown is only that considered suitable for support of depot maintenance operations. Industry has substantial unutilized capacity in every area. Also depicted is the FY 1993 DoD organic depot maintenance workload for the six commodity areas. There is no question that industry has the capacity to absorb additional depot maintenance workload in any area. The data, however, indicates that industry also needs to continue capacity downsizing efforts.

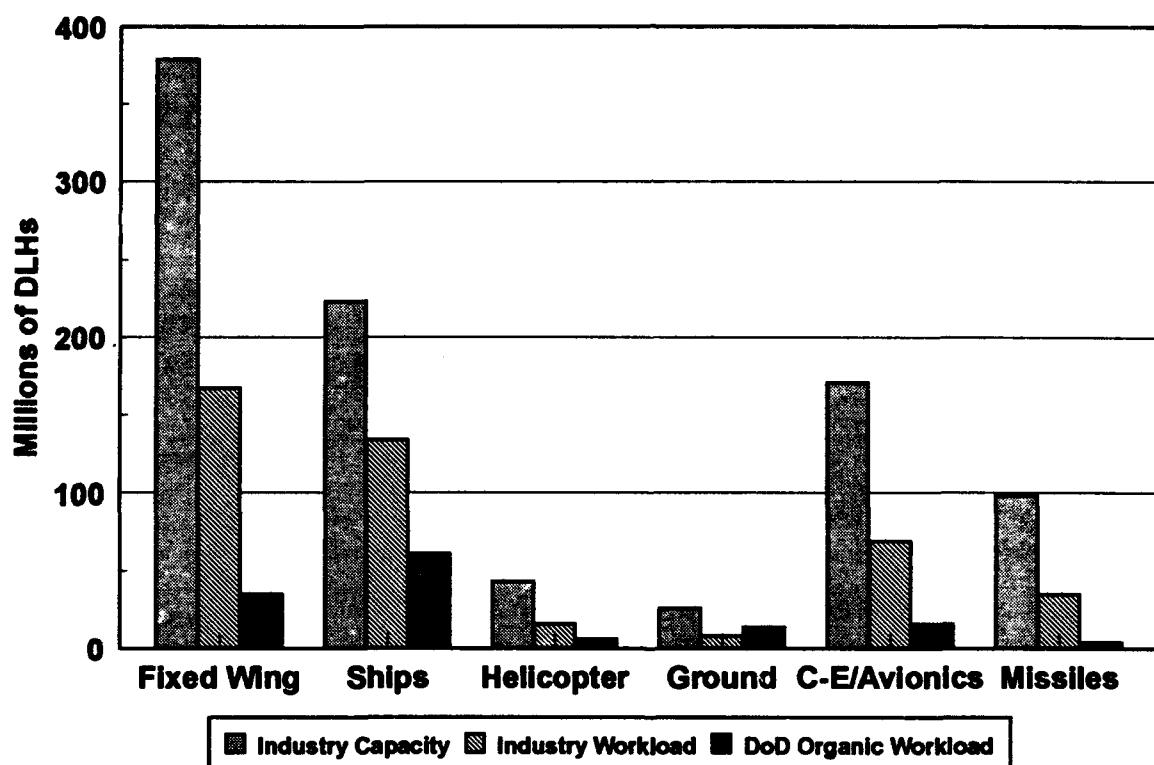


Figure 4. *Industry Capacity for Depot Maintenance Work*

DoD is incurring heavy costs for retaining excess public and private sector depot maintenance infrastructure. As shown in Figure 5, and detailed in Appendix C, the requirement for depot maintenance production in terms of direct labor hours has

declined substantially, going down by about 14 percent since FY 1990. The cost for each of those direct labor hours, on the other hand has increased. Some analysis indicates this is largely attributable to high fixed overhead cost. For example, it is estimated that an organic depot with several thousand employees incurs fixed overhead costs in the range of \$50-100 million annually. Hence, elimination of unneeded organic maintenance depot infrastructure affords the Department the opportunity for substantial savings. In addition, the Department should obviously be extremely prudent to avoid establishing unneeded capacity when transitioning workload from private sector sources to organic depots (such as for new weapon systems).

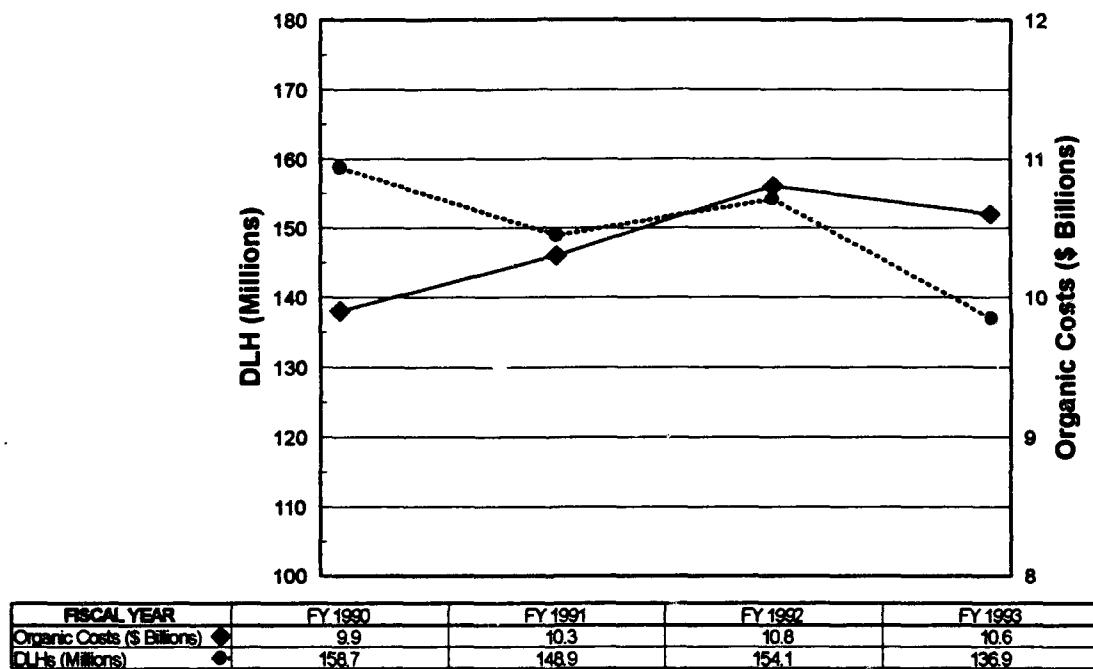


Figure 5. DoD Organic Maintenance Depot Production and Costs

MISSION ESSENTIAL WEAPON SYSTEMS MAINTAINED BY PUBLIC AND PRIVATE SECTORS

The Task Force agreed that there is an irreducible minimum of organic capability -- CORE -- that the Military Services must possess in order to be able to meet readiness and sustainment requirements. Under this relatively new CORE concept and its related decision process, requirements driven by the JCS contingency scenarios

result in the Services identifying combat-related mission essential weapon systems and equipment. They then translate depot maintenance support for these systems into specific depot maintenance capability requirements. Where the Services are certain that they must maintain control of depot support in order to minimize risk to combat commanders, the capabilities are established and retained in organic maintenance depots. When satisfied that CORE capabilities are adequately provided for or not required, the Services turn to the private sector for support. Therefore, for many systems designated as mission essential, depot maintenance support is in the private sector. Figure 6 graphically depicts the derivation of workload to support the CORE policy and similarly depicts the placement of certain mission essential workload in the private sector. While not descriptive of the current decision process of each Service, Figure 6 is nonetheless representative of the approach being used to revise these processes to reflect the CORE policy. Appendix E addresses the Services' approaches to workload assignments while Appendix G provides a complete review of DoD CORE policy and CORE workload calculation.

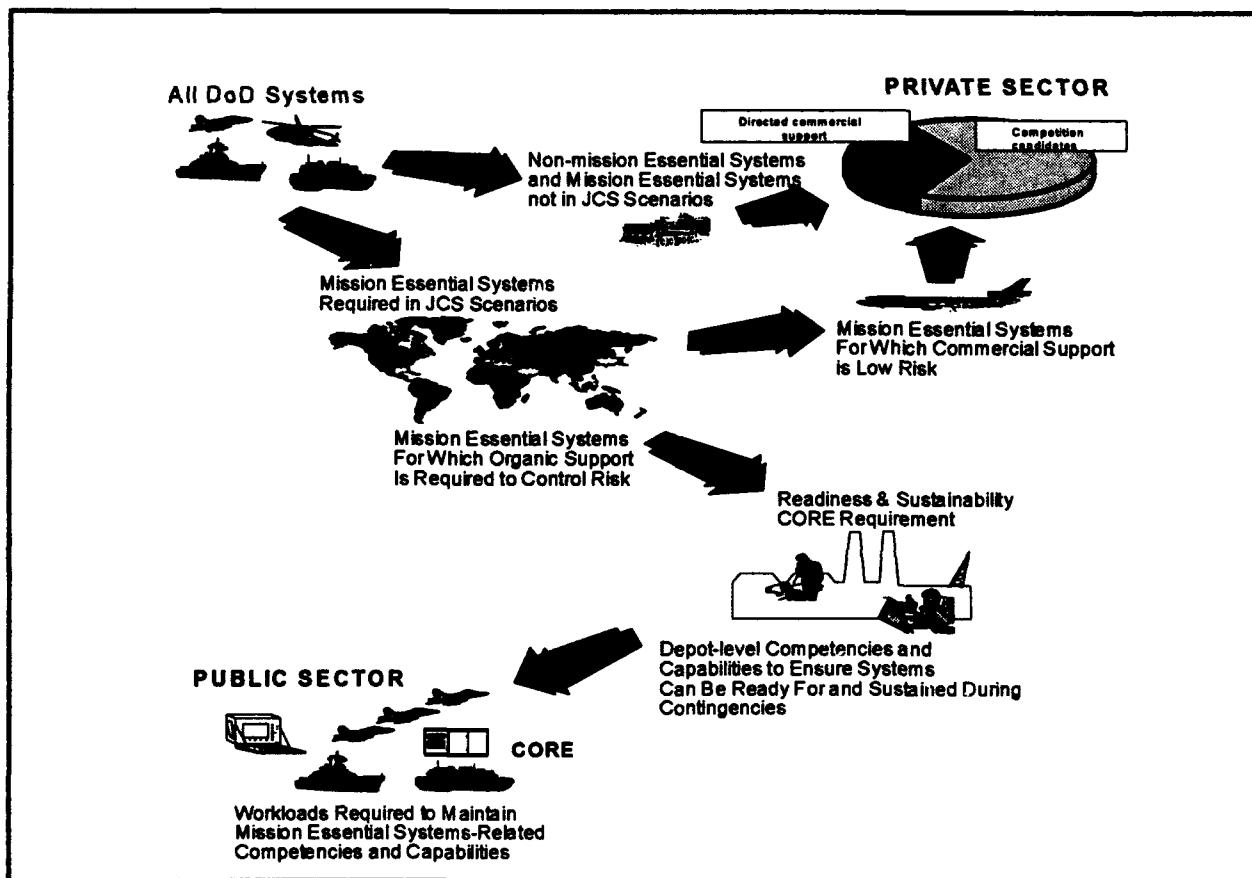


Figure 6. *Deriving CORE and Allocation of Workloads*

The Task Force endorsed CORE, both in terms of the basic concept and in terms of the specific features ascribed to the concept. The most salient features are as follows:

- CORE consists of organic capabilities -- i.e., skills, competencies , facilities, and equipment that exist within government depots and shipyards.
- CORE is needed to assure that readiness and sustainment requirements related to JCS contingency scenarios are met. CORE is justified when it minimizes operational risks and demonstrably supports required readiness.
- The Services preserve their CORE capabilities with the minimum infrastructure (facilities, equipment and personnel) required; depot capacity beyond that needed for CORE will be used only for "last source of repair" and "cost control workload" (as approved by the DDMC).
- The primary workloads assigned to depots in support of CORE capabilities should be maintenance of weapon systems included in JCS combat contingency scenarios.

These features have important implications in terms of clarifying the scope and nature of depot activity. First of all, the definition of CORE as organic capability means that it consists of skills and competencies, not work on specific weapon systems. It is not necessary that specific contingency weapon system workload be retained but rather that a capability relevant to that weapon system be preserved using appropriate workloads. CORE is the capability to support, not the maintenance of specific weapon systems. Consistent with the above, DoD has established the following policy on CORE:

Depot maintenance CORE is the capability maintained within organic Defense depots to meet readiness and sustainability requirements of the weapon systems that support the JCS contingency scenario(s). CORE exists to minimize operational risks and to guarantee required readiness for these weapon systems. CORE depot maintenance capabilities will comprise only the minimum facilities, equipment and skilled personnel necessary to ensure a ready and controlled source of required technical competence. Depot maintenance for the designated weapon

systems will be the primary workloads assigned to DoD depots to support CORE depot maintenance capabilities.⁷

Task Force members noted that current DoD policy was not definitive as to whether support for CORE requirements are Service-specific, deriving from Title 10 responsibilities, or can be consolidated as DoD CORE. The Task Force concluded, with the Air Force dissenting, that CORE should be Service specific and that such an approach is essential to support Military Service Title 10 readiness responsibilities. These responsibilities cannot be delegated to another Service and must be supported with requisite authority, resources and control. Interservice agreements, where two or more Services agree that CORE capabilities for common (or almost common) weapon systems or equipment will be protected by one of the Services, are a way to ensure that duplicate capabilities are minimized. The Task Force supports interservicing in such cases that result in a single Service providing the support of multiple-Service CORE requirements. The DDMC should be empowered to make these decisions for the Department.

CORE exists as a principal risk management tool for each Service to support its contingency responsibilities. The skills, competencies and facilities established to provide CORE capabilities, fully integrated with the complete spectrum of Service logistics and operational support management, should be under the absolute control of each Service to provide the responsiveness and flexibility required. The Task Force concluded that Service-specific CORE will provide more responsive support and can be achieved efficiently.

Current management philosophy within the Department, reflecting the recommendations of such as the Packard Commission, emphasizes centralized policy and decentralized execution. Service-specific CORE based on a DoD-wide methodology appears to be consistent with this management philosophy. The Air Force took the position that CORE capabilities should be established and maintained as a DoD CORE through competition between Service depots. Thus, CORE would be DoD rather than Service specific. Their belief is that this would be the most cost-

⁷DUSD(L) Memorandum, November 15, 1993, Subject: Policy for Maintaining CORE Depot Maintenance Capability.

effective and efficient. Additional discussion of the CORE concept can be found in Appendix G.

Currently, after CORE requirements are satisfied, a number of approaches are used in determining the source of repair for non-CORE workloads. These approaches range from decision support processes as discussed in Appendix E to full and open competition.

THE ROLE OF COMPETITION

It has been long-standing fundamental government policy that the Federal government should not compete with industry in providing products or services readily available in the private sector. Exceptions to this policy are outlined in Office of Management and Budget Circular A-76. The policy exceptions include, in part, where there is a compelling national defense requirement (such as CORE) and in the case of existing government operations where it can be demonstrated that in-house operations can provide the products or services at a lower cost than the private sector.

A major issue associated with CORE policy implementation is the degree to which public depots should be limited in performing work that is not required to maintain CORE capabilities (i.e., non-CORE work). At the heart of this issue is the role of public-private competition.

The DoD CORE policy is silent regarding the disposition of non-CORE workload, however all of the Service and industry members of the Task Force unanimously support competition as the preferred distribution tool. All of the Services and industry members, except for the Air Force, believe that this competition should be private-private, not public-private.

Competition is the traditional process by which free markets determine the allocation of goods and services. According to conventional market theory, the unfettered interplay of forces of supply and demand produces the fairest and most efficient economic outcomes. In recent years, DoD has stressed the importance of infusing the depots with the benefits of private sector business management practices, including increased competition for workload.

Whether depot competitions with industry can be considered successful, and whether public-private competitions should be continued in the future depends on whether these competitions are considered "meaningful" in a true economic sense. Conventional market theory describes competition as occurring when a multiplicity of buyers and sellers freely compete on equal terms. Clearly, that situation does not occur in the defense business because the government is the sole buyer – the defense market is a monopsony. This market distortion is accepted as an unavoidable requirement of national sovereignty and security, so most discussion of "meaningful competition" in the context of defense workload focuses on the rivalry among suppliers for federal funds.

Theory and history both suggest that such rivalry can be (and generally is) harnessed to drive down cost. Competition among commercial suppliers (private-private competition) is considered "meaningful" when market forces work and the customer can get what he needs at the lowest possible cost. When the theory was tested using public-private competitions, initial results were encouraging. The short-term results seemed to justify the effort and expense involved. However, setting aside the contentious question whether such competitions are fairly conducted, there is serious concern that public-private competitions for depot maintenance workload are *not* "meaningful" competitions, and that, in the long-term, such competitions may represent bad policy.

After initial experiences, the defense depots that competed successfully quickly found that they were given no meaningful financial rewards, and offered no real incentives to repeat their achievement (i.e., no "profits" were returned to those involved in winning the competition; no "savings" were set aside to reinvest in improved plant and equipment, etc.). No evidence could be found that suggested market forces were at work. Perhaps even worse, the unsuccessful depots quickly realized that there were no negative repercussions to competitive failure – no managers lost their jobs and no depot or shipyard went out of business ("efficiency" and "competitiveness" are not criteria taken into consideration by the Base Closure and Realignment Commission – many of the depots which have been closed had good competition records). Again, market forces were not working. For these and other reasons, there is justifiable skepticism over the wisdom of calling public-private depot competitions "meaningful".

If they are not meaningful, then they cannot be relied upon to produce the desirable results expected in the economic model.

Besides procedural questions, the Task Force members shared a concern over the divisive effects of a policy that asks private sector firms to aggressively compete with their major (sometimes only) customer. It was evident from Task Force discussions that friction, and even suppressed hostility, was a not uncommon byproduct of hard fought public-private depot competitions. To the extent that the anecdotal evidence is true, these competitions may be undermining the government-industry teamwork so critical to the nation's defense. These relationships have been of tremendous benefit to DoD and should not be allowed to disappear.

Philosophically, the Task Force majority subscribes to the following premises:

- The role of government in the United States is to provide essential public services that the private sector either cannot or will not provide; it is not the role of government to supplant the marketplace.
- The presumption in favor of market solutions to most public needs is based on a belief that the free interplay of forces of supply and demand produces the most desirable outcomes; this conviction derives not only from a preference for efficiency, but also from firmly rooted ideals concerning individual freedom and limits on authority.
- The Cold War was waged and won in large part to protect these principles; while it is true that national security sometimes demands deviations from the standards of limited government and market economics, such deviations should be permitted only when they are absolutely necessary.

Government maintenance depots and shipyards were not created to compete with private industry and the public-sector environment in which they currently operate cannot, and does not, allow normal market forces to work. Only by artificially manipulating the playing field can bids be solicited and evaluated, and a "winner" selected. In conventional economic terms, public sector organizations distort the marketplace. Thrusting DoD depots and shipyards into competitions with industry

compromises the very quality of the free market that makes it so useful as an honest arbiter of "value" -- fairness and objectivity.

Finally, the Task Force believes it to be unworkable to use competition to determine sources of repair until the Department can accurately and reliably determine its costs for depot maintenance operations. In any case, the Department needs to establish a reliable financial management system in order to effectively manage its depot maintenance business.

All members of the Task Force, except the Air Force, take the position that public depots should target their size to the CORE workload requirement. The Task Force, less the Air Force, believes that the dramatic savings which each Service must achieve can only be met by eliminating the fixed infrastructure costs associated with excess depot capacity⁸. Given that Service depots downsize to Service CORE, they will no longer have significant excess capacity, and will, therefore, not be in a position to take on additional workload. Additionally, the transient and uncertain nature of workloads won through competition would unnecessarily complicate effective management of CORE related capabilities. To sustain readiness, DoD must divest excess infrastructure that is expensive to maintain. Consequently, it is essential that the future organic depot maintenance infrastructure be downsized consistent with support of CORE capabilities, and not randomly shaped by the unpredictable results of competition.

For this and other reasons discussed above, the depots should discontinue all public-private competitions for non-CORE work, except as approved by the Defense Depot Maintenance Council. The Task Force recommends discontinuing public-private competitions for non-CORE work.

Conversely, the Air Force Task Force members stated that the source of repair should be determined by public-private and public-public competition programs. Their position is that such an approach will result in lower costs to the warfighters and the most efficient organic depot maintenance infrastructure. The Air Force reports substantially lower costs from public-private competitions whether won by air logistics centers or private sector firms. The remainder of the Task Force members question the

⁸ One of the most important features of the CORE policy is the workload sizing methodology which was designed to help the Services select from all potential workload the *minimum amount* required to protect CORE capabilities.

interpretation of DoD data on competitions, and challenge the Department's ability to create a level playing field for public-private competitions. The Task Force reviewed 105 bids associated with 28 competitive awards as well as 55 completed contracts but found that, due to large variations in bids and scope changes, the results are inconclusive. Appendix F provides additional detail regarding these reviews and other pertinent issues.

Interservicing is one cooperative approach which results in efficient cross-Service use of resources, capabilities and facilities. Procedures to carry out this process are well established and focused on providing DoD with efficient depot maintenance support for common items and, in some cases, common technology requirements. With regard to public-public competitions, the Task Force position, less the Air Force, is that interservicing of depot maintenance work for common systems is preferable to direct Service against Service competitions. Some selected workloads that are not required to sustain CORE capabilities may be used to maintain needed private sector industrial base capabilities. The remaining workload would be competed in the private sector to take advantage of the competitive market place and achieve best value for DoD. This approach provides a rational balance, ensures depot maintenance support to operational forces, and offers the potential to use depot maintenance workload to help preserve needed private sector industrial base capabilities.

INDUSTRIAL BASE CONSIDERATIONS

The CORE concept provides the basis for establishing and maintaining the public depot maintenance industrial base. This concept will also provide substantial workload to private sector industrial base segments. To be effective in supporting the private sector industrial base, some depot maintenance workload may have to be allocated to targeted industrial activities. For example, Defense depot maintenance workload is particularly critical to the economic viability of private shipyards. Analysis of workload and capacity data, as briefly discussed above, indicates there is potential for some depot maintenance workloads to contribute to the preservation of needed private sector industrial base capabilities.

The Task Force recognized that both DoD and industry are working hard to eliminate excess capacity and to efficiently utilize resources. To that end, the Task

Force found that attention must be paid to reintroduction into the Defense industrial base of depot maintenance facilities that have been closed by DoD and turned over to the private sector. While not in any way concluding that there should be specific limitations on reuse or conversion of these facilities, the Task Force believes it appropriate to identify that reintroduction of this capacity into the industrial base could have detrimental effects on the base.

THE BALANCE BETWEEN THE PUBLIC AND PRIVATE SECTORS

Providing essential depot maintenance resources and capabilities is a key concern of logistics managers. Implementation of the CORE concept will lead to an appropriate and acceptable balance of capabilities and workloads between the public and private sectors. Preservation of public sector maintenance depots' skilled workforce and facilities is a sensitive and important issue with members of Congress. As a consequence, DoD depot maintenance is operating under a number of congressionally mandated guidelines that, in some ways, limit management flexibility.

Congress passed legislation in 1991 that had the effect of establishing a de facto CORE. The National Defense Authorization Act for FY 1992 and FY 1993 required that "...not less than 60 percent of the funds available for each fiscal year for depot level maintenance of Army and Air Force materiel shall be used for performance of such depot level maintenance by employees of the Department of Defense." In 1993, Title 10 of the United States Code was amended to further expand this restriction to include the Navy and required that the Military Departments may not contract performance by non-Federal government personnel of more than 40 percent of the depot level workload. Another example of existing legislative guidance is the requirement that competitive procedures must be used to change the source of repair from any organic depot to contractor for workloads valued at \$3 million or more.

Given these legislative constraints and the Department's own guidelines and procedures for workload management, it is clear that there are substantive challenges to be met in transitioning to a DoD depot maintenance infrastructure based on CORE. Even with such a comprehensive concept as CORE, there may continue to be conflicting Departmental and external goals that need to be reconciled. For example, the consolidation of all DoD tactical missiles at a single site, while initially perhaps well-

conceived, may not now be consistent with the CORE concept or with the need to use depot maintenance workload to support certain segments or technologies within the private sector industrial base. The Task Force concluded that depot maintenance concepts for commodities such as tactical missiles should be reevaluated based on changing technology, integration with production workload, and economies and efficiencies. In fact, it is evident that DoD depot maintenance concepts for workload transitions, such as planned for tactical missiles and for new weapon systems, will need to be modified to accommodate the CORE concept.

It is anticipated that quantification of CORE requirements in each Service will result in identification of less than 60 percent of peacetime workload as being needed in organic depots to maintain CORE capabilities (early indications, as stated above, place the level in the range of 40-50 percent). Given that the appropriate balance between the public and private sectors can be achieved through implementation of the CORE concept, it is evident existing legislative guidelines (60/40 split of workload) may prevent reaching a balance that is analytically derived. Similarly, the requirement to use competitive procedures to change workloads valued at \$3 million or more from an organic source of repair to a private sector source of repair precludes orderly management of workload transitions. The Task Force understands that the legislation is intended to require that the incumbent public depot compete for the workload to be transitioned. The Task Force, however, concluded that relief from existing legislation is needed to provide the necessary management flexibility to maintain high readiness in the face of declining resources.

CONCLUSION

A proper balance of depot maintenance workload between the public and private sectors of the defense industrial base will be achieved when the government depots and shipyards have reduced their workloads to the minimum required to protect critical CORE capabilities, and private companies have an opportunity to compete among themselves for everything else. In reality, there will always be workloads which industry cannot or will not compete for; in these cases it falls to the organic depots to act as "last sources of repair." Likewise, there will be occasional situations when a Service finds that there are insufficient qualified commercial bidders for a particular non-core workload, and a DoD depot may be asked to assume the

workload or to compete with industry on an exception basis. These inevitable anomalies do not change the basic strategy. The majority Task Force position is that public depots should concentrate on the work needed to protect their CORE capabilities, and that workload not needed to maintain those capabilities should be accomplished in the private sector. As previously indicated, the Task Force (less the Air Force) supports discontinuing public-private competitions for non-core work and, similarly, to use interservicing procedures, with Defense Depot Maintenance Council oversight, in lieu of public-public competition, for common hardware items requiring CORE capabilities.

APPENDIX A

TERMS OF REFERENCE

APRIL 1994

DEFENSE SCIENCE BOARD
DEPOT MAINTENANCE MANAGEMENT TASK FORCE



ACQUISITION AND
TECHNOLOGY

THE UNDER SECRETARY OF DEFENSE

3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010



JAN 14 1994

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Terms of Reference -- Defense Science Board Task Force
on Depot Maintenance Management

You are requested to establish a Defense Science Board (DSB) Task Force to assess the overall performance and management of depot-level maintenance activities of the Department of Defense. The assessment shall include the following:

(1) The identification of the depot-level maintenance workloads that were performed during each of fiscal years 1990 through 1993 for the military departments and the Defense Agencies by employees of the Department of Defense and by non-Federal Government personnel.

(2) An estimate of the current capacity to carry out the performance of depot-level maintenance workloads by employees of the Department of Defense and by non-Federal Government personnel.

(3) An identification of the rationale used by the Department of Defense to support a decision to provide for the performance of a depot-level maintenance workload by employees of the Department of Defense or by non-Federal Government personnel.

(4) An evaluation of the cost, manner, and quality of performance of the depot-level maintenance workload by employees of the Department of Defense and by non-Federal Government personnel.

(5) An evaluation of the manner of determining the core workload requirements for depot-level maintenance workloads performed by employees of the Department of Defense.



(6) A comparison of the methods by which the rates and prices for depot-level maintenance workloads performed by employees of the Department of Defense are determined with the methods by which such rates and prices are determined for depot-level maintenance workloads performed by non-Federal Government personnel.

(7) A discussion of the issues involved in determining the balance between the amount of depot-level maintenance workloads assigned for performance by employees of the Department of Defense and the amount of depot-level maintenance workloads assigned for performance by non-Federal Government personnel, including the preservation of surge capabilities and essential industrial base capabilities needed in the event of mobilization.

(8) An identification of the depot-level functions and activities that are suitable for performance by employees of the Department of Defense and the depot-level functions and activities that are suitable for performance by the non-Federal Government personnel.

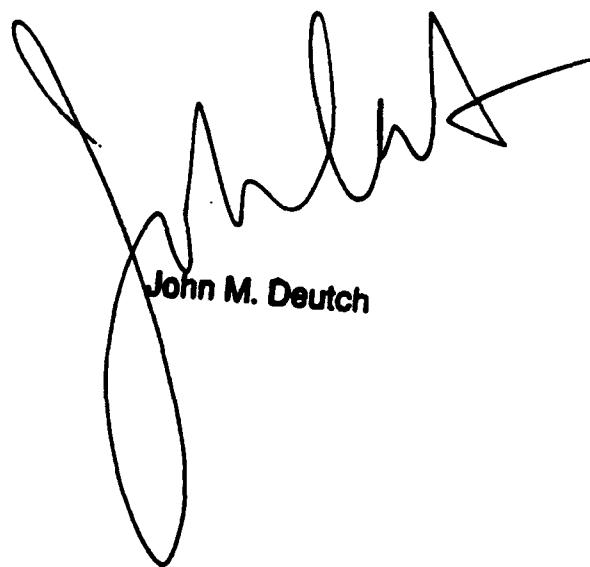
(9) An identification of the management and organizational structure of the Department of Defense necessary for the Department to provide the optimal management of depot-level maintenance and the allocation of related resources.

Additionally, the Task Force will, within the constraints of time and resources available, address the following areas:

(a) Approaches to improve overall efficiency of depot maintenance in organic and private industrial facilities, including strategies with the greatest potential for achieving significant improvements through new technology applications, process improvements, modern business practices, reliability improvements and other appropriate means.

(b) Depot maintenance plans for new items of equipment and compare relative cost effectiveness of organic and private industry facilities, including major weapon systems, missile systems, electronics, software, etc.

The Deputy Under Secretary of Defense (Logistics) will chair this Task Force. Mr. Robert N. Parker will serve as Chairman of the Task Force. Mr. Wimpy D. Pybus of the Office of the DUSD (Logistics) will serve as Executive Secretary. LtCol Keith M. Larson, USAF, will be the Defense Science Board Secretariat representative. The Office of the USD(A&T) will provide funding and other support as may be necessary. It is not anticipated that the work assigned to this Task Force will cause any member to be placed in the position of acting as a procurement official. A final report should be provided to the USD(A&T) by March 15, 1994, to ensure submission of the report to the Secretary of Defense by April 1, 1994. The report will provide specific responses to the assessments required by Section 341 of the Fiscal Year 1994 National Defense Authorization Act, and will include recommendations of the Task Force for any legislative and administrative action the Task Force considers to be appropriate.



John M. Deutch

APPENDIX B

TASK FORCE MEMBERS

APRIL 1994

DEFENSE SCIENCE BOARD
DEPOT MAINTENANCE MANAGEMENT TASK FORCE

DEFENSE SCIENCE BOARD
DEPOT MAINTENANCE MANAGEMENT TASK FORCE MEMBERSHIP

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Task Force Chairman

MEMBERS

Mr. Wimpy Pybus

Executive Secretary

Lt. Col. Keith Larson, USAF

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BGen Terrence R. Dake, USMC

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Mr. Robert H. Denien

*Vice President, Grumman
Aerospace & Electronics*

Brig Gen Dennis K. Hummel, USAF

*HQ USAF, Director of
Maintenance*

Mr. John H. Moellering

*Vice President,
UNC Aviation Services*

Mr. Ray Van Omerschelde

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Pratt & Whitney*

RADM (Sel) Wayne Smith, USN

NAVAIR

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Chairman & CEO
Cypress International*

LTG Leo Pigaty, USA

*Panel Co-Chairman
Deputy Commander
Army Materiel Command*

Mr. Joseph P. Cribbins

*Special Assistant,
DYNCORP*

BGen G.M. Karamarkovick, USMC

*HQ USMC, Asst DC/S
Installations & Logistics*

Mr. Kenneth S. Morton

*Vice President,
Martin Marietta Services*

Mr. Ralph Price

*Exec Director, Marine
Corps Logistics Bases*

Mr. Adolf Quillici

*Retired Vice President & General Manager
FMC Defense Systems Group*

Mr. Albert Spaulding

*President, Automated
Research Systems, Inc.*

MGen Joseph Stewart, USMC

*Commander,
Marine Logistics Bases*

BG James Wright, USA

*Director, Plans and
Operations, ODCSLOG*

Missiles and Electronics Panel

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Vice President,
Hughes Aircraft Company*

Lt Gen Charles Franklin, USAF

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Systems Center*

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*President, Litton
Guidance & Control
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RADM Walter Cantrell, USN

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Naval Warfare Systems
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Mr. Keith Dumas

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Sacramento Air Logistics
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Electronics Command*

Mr. Robert Riggs

*Prin Asst DC/S I&L,
HQ, USMC*

Mr. Gilbert Sentimore

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GLS Associates, Inc*

Mr. C. (Gus) Xintas

*Vice President,
Westinghouse Electric
(ESG)*

Mr. Federik P. Zimmer

*Vice President,
Rockwell International*

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*Panel Co-Chairman
Commander, NAVSEA*

Mr. James E. Turner, Jr.

*Panel Co-Chairman
President, General
Dynamics Electric Boat
Division*

RADM Robert Chamberlain, USN

*Director Supply
Management,
Defense Logistics Agency*

Mr. William Coonce

*Director, Revolving
Funds, OSD Comptroller*

Mr. Richard A. Goldbach

*President, Metro Machine
Corporation*

Mr. Thomas P. Jones, Jr.

*Vice President, Atlantic
Marine Holding Company*

RADM Edward S. McGinley, II, USN

*Commander, Naval Surface
Warfare Center*

Mr. W. R. "Pat" Phillips, Jr.

*President,
Newport News Shipbuilding*

RADM Paul Robinson, USN

ODCNO (Logistics) N-43

Mr. John L. "Jack" Roper, IV

*Executive Vice President,
Norfolk Shipbuilding &
Dry Dock Corporation*

WORKING GROUPS

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<i>Major Jim Budney, USA</i>	<i>Administrative Support</i>
<i>Major Ken Dunnum, USMC</i>	<i>Administrative Support</i>
<i>Mr. Stephen Michaluk</i>	<i>Administrative Support</i>

Capacity and Data Working Group

<i>Mr. Hollis Hunter</i>	<i>Chairman JDMAG</i>
<i>Mr. Ron Baty</i>	<i>HQ AFMC/LGP</i>
<i>Ms. Sandra Daschle</i>	<i>MCLB Albany/881</i>
<i>Mr. Ralph Giarratana</i>	<i>SPAWAR/10-222-2A</i>
<i>Mr. Alan Gray</i>	<i>NADOC/311</i>
<i>Ms. Cheryl Pleasant</i>	<i>NADEP Norfolk/902</i>
<i>Mr. Dave Shaffer</i>	<i>AMSAA/AMXSY-L</i>
<i>Mr. Walter T. (Tilly) Smith</i>	<i>NAVSEA/SEA-0723</i>
<i>LTC Brent Swart</i>	<i>HQDA/DALO-SMM</i>

Cost and Price Working Group

<i>Mr. John Evans</i>	<i>Chairman OSD Comptroller</i>
<i>Mr. Gary Baker</i>	<i>Deputy Director MCLB Barstow</i>
<i>Mr. Miles Baker</i>	<i>DoD IG</i>
<i>Ms. Margie Huffman</i>	<i>Army, Financial Management</i>
<i>Mr. Joe Malacavage</i>	<i>OSD Comptroller, Management Systems</i>
<i>Mr. John Martin</i>	<i>Navy, NAVAIR</i>

<i>Ms. Marie Mobley</i>	<i>AFMC/LGP</i>
<i>Mr. Jack Mulcahy</i>	<i>Navy, NAVSEA</i>
<i>Mr. Frank Zardecki</i>	<i>Tobyhanna Army Depot</i>

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APPENDIX C

DEPOT LEVEL MAINTENANCE WORKLOADS

TASK 1: The identification of the depot-level maintenance workloads that were performed during each of fiscal years 1990 through 1993 for the military departments and the Defense Agencies by employees of the Department of Defense and by non-Federal Government personnel.

APRIL 1994

**DEFENSE SCIENCE BOARD
DEPOT MAINTENANCE MANAGEMENT TASK FORCE**

TASK 1: The identification of the depot-level maintenance workloads that were performed during each of fiscal years 1990 through 1993 for the military departments and the Defense Agencies by employees of the Department of Defense and by non-Federal Government personnel.

OVERVIEW

At the beginning of the Base Realignment and Closure (BRAC) process in 1988, the Department of Defense was performing depot maintenance operations at 35 major DoD¹ and thousands of contractor facilities. With full implementation of currently approved BRAC decisions, the number of DoD facilities will be reduced to 24. Corresponding reductions are also taking place in the private sector.

The tasking above requires the identification of depot-level maintenance workloads performed in these DoD and private sector facilities. In organizing to collect the data necessary to respond to this requirement, both the DoD and industry representatives agreed that the most meaningful aggregation of workload would be in 16 weapon system categories that were further aligned into the four commodity groupings into which the Task Force was organized. The categories and groupings are reflected in the table below:

Fixed Wing <ul style="list-style-type: none">• Fighter/Bomber/Attack• Transport/Tankers• All Other Fixed Wing	Ground <ul style="list-style-type: none">• Helicopters• Combat Vehicles/Artillery• Automotive/Construction• Ordnance/Weapons/Munitions• All Other Ground
Electronics/Missiles <ul style="list-style-type: none">• Strategic Missiles• Tactical Missiles• Communications-Electronics• Avionics	Sea Systems <ul style="list-style-type: none">• Aircraft Carriers• Submarines• All Other Ships• Components

Over the years many statistics have been released that reflect differing amounts of depot-level maintenance workload. The reason for these apparent conflicts result from different sets of rules or principles used to develop the statistics. One reason for different totals has been the tendency to focus on the depot maintenance appropriation amount. This understates the total amount of actual depot maintenance work since other appropriations also fund depot maintenance. A second reason is the difference between appropriations, obligations, actual execution or expensing, and financial

¹Major DoD maintenance depot being defined as a facility employing more than 400 personnel in depot maintenance.

completion. The amount that was Congressionally appropriated may be different than the amount obligated due to reprogramming action. Actual execution and expensing occurs over several years, not just in the year of obligation. Delays occur in financially completing orders for a number of technical reasons that have no relationship to actual execution and expensing. Therefore, each of these perspectives yield different amounts.

The Task Force selected actual program execution for purposes of responding to this task. The executed program is the one statistic that accurately reflects the activity that was conducted in a depot facility for a selected fiscal year. The Task Force also determined that all depot-level maintenance workload would be collected, regardless of the funding source and regardless of the location where the work was conducted. Because of this decision, work from several public sector facilities that are not part of the Defense Business Operating Fund (DBOF) are included as well as depot maintenance from several facilities that are primarily devoted to other purposes.

Task 1 portrays actual execution or expense data. Budget data was addressed in Task 4 and is presented in Appendix F.

Consistent with the decision to collect actual program execution data for each fiscal year, workload was collected by performing public sector depot. The most significant impact of this decision is that interservice workload is reflected in the service total of the performing service, not the requiring service. Other data portrayals (e.g., appropriation or obligation) align these workloads to the requiring service.

The principal focus of this appendix will be to portray in then year dollars, for both the public sector and private sector, a summary of workload information as required in the tasking. This focus will be on the total magnitude of the data. Two important points will be portrayed:

- 1) The overall magnitude of the workload value is much larger than has been traditionally portrayed. The total annual program value actually executed, public sector and private sector, averages about \$15 billion rather than the \$13 billion statistic usually quoted. The number is larger because a more comprehensive effort was made by the Task Force to include everything (e.g., non-DBOF activities, depot maintenance performed at other than depots, contract depot maintenance administered by program managers, and depot maintenance funded with other appropriations).
- 2) The overall trend for the split between the public and private sector reflects an increasing share of workload being conducted by the public sector. The increase was from 67 percent in 1990 to 71 percent in 1993.

The second focus of the data portrayal will be across the commodity groupings and weapon system categories. What is remarkable about looking at the workload for

each of the commodity and weapon system groups is the stability of the respective percentages of the total workload. For example, in fiscal years 1990 through 1993 fixed wing varies from 29 to 31 percent of the total workload, helicopters from 6 to 8 percent, ordnance/weapons/munitions from 1 to 2 percent, combat vehicles/artillery/automotive/ construction/other ground remains at about 7 percent, missiles from 3 to 4 percent, C-E/avionics from 13 to 14 percent, and sea systems from 37 to 39 percent. With the total aviation share (fixed wing and helicopter) averaging about 37 percent and the total sea systems share averaging about 38 percent of all work, they dwarf all other workload categories which all total to about 25 percent.

The third focus of the data portrayal will be by military service. The following reflects the ranges of workload share performed (organic) and administered (contract) by each of the services and DLA for the 1990 through 1993 period: Navy - 59 to 60 percent, Air Force - 25 to 27 percent, Army - 13 to 15 percent, Marine Corps - 1 percent, and DLA - 1/10th percent.

Finally, at the end of this paper, appropriate conclusions and recommendations will be presented.

DISCUSSION

Methodology

Initial consideration was given to satisfying the requirements of this task by using data reported in accordance with DoD 7220.9-M, Chapter 76, *Special Cost Accounting and Reporting Requirements for Depot Maintenance*. This data base provides an annual report by job order, by work breakdown structure, by work performance category, by customer for both public sector and private sector depot maintenance workloads. The service members of the Working Group assigned to Task 1, rejected use of the DoD 7220.9-M data, even though it had all the structural characteristics necessary to satisfy the task. The three reasons for the rejection are: First, data reported into 7220.9-M was known to be incomplete because it did not include all customers and facilities. Second, the data was known to be inaccurate and the USD(A&T) and the DUSD(L) had imposed data certification requirements for data used for this purpose. Third, data reported under 7220.9-M was keyed to financial completions. Financial completions do not reflect actual work performed in public sector depot maintenance activities and do not form the basis of actual depot production operations management. Collection of financial completion data does serve different useful purpose, that of calculating unit cost. The Working Group decided that actual execution or expense data should be used since it is the one statistic that accurately reflects the true level of activity in public sector maintenance depots.

A Data Call Was Developed To Satisfy Task 1 Requirements:

Since the data necessary to respond to Task 1 was not available in an accurate useful form from an existing single source, it was necessary to structure a data call. Both Government and industry representatives agreed on the structure for the data call. Workload classifications for commodity groupings and weapon system categories were jointly developed. It was agreed that the Government would provide both public and private sector responses. Workload would be collected in direct labor hours and cost for public sector activities, but only cost data would be collected for private sector workload². Private sector data would be reported by the administering service. Interservice workload would be reported by the performing service.

The Content Of The Data Was Intended To Be Inclusive Of All Workload Performed:

Public Sector Content:

- All work accomplished at maintenance depots, regardless of level, and including modifications and upgrades
- All costs including direct, indirect, and overhead costs, salaries, material and parts, utilities, depreciation, capital investment, facility repair, and support services
- Depot maintenance workload from all funding sources, not just that funded from the depot maintenance program appropriation
- Depot work accomplished at facilities primarily devoted to other purposes
- Work at non-DBOF depot maintenance facilities

Not Included In Public Sector Data:

- Cost comparability adjustments, DBOF adjustments, major military construction projects, and procurement of major modifications applied in public sector depots
- Army ammunition and other non-maintenance depot operations. Navy Weapon Station and Warfare Center non-maintenance operations.

Private Sector Content:

- All contract depot maintenance workload including program manager and program executive officer administered contracts
- Contractor logistics support (CLS) and interim contractor support (ICS) for depot maintenance

²Industry is not required to provide direct labor hour data as a reportable contractual requirement for many workloads accomplished.

SUMMARY OF RESPONSES

Total Value of Workload:

As shown in Figure C-1, the total program value actually executed, public sector and private sector, averages about \$15 billion. Helicopter workload was split out from the ground systems commodity group because of its special interest and the electronics and missiles data was similarly separated in this portrayal. The percentages for these breakouts are as follows:

<u>Breakout (Percentages)</u>	<u>FY90</u>	<u>FY91</u>	<u>FY92</u>	<u>FY93</u>
Fixed Wing	29	29	30	31
Helicopters	8	7	6	7
Ground (less Helicopters)	8	9	8	8
Missiles	3	4	4	4
C-E/Avionics	14	13	13	13
Ships	38	38	39	37

The percentage share breakouts above are very stable from year to year for the period 1990 through 1993. The important point to draw from this data is that with aviation (fixed wing and helicopter) averaging about 37 percent and ships averaging about 38 percent, all other groupings combined total to only 25 percent of the workload value. Table C-1 below provides detailed data on the combined total of public sector and contract workload value.

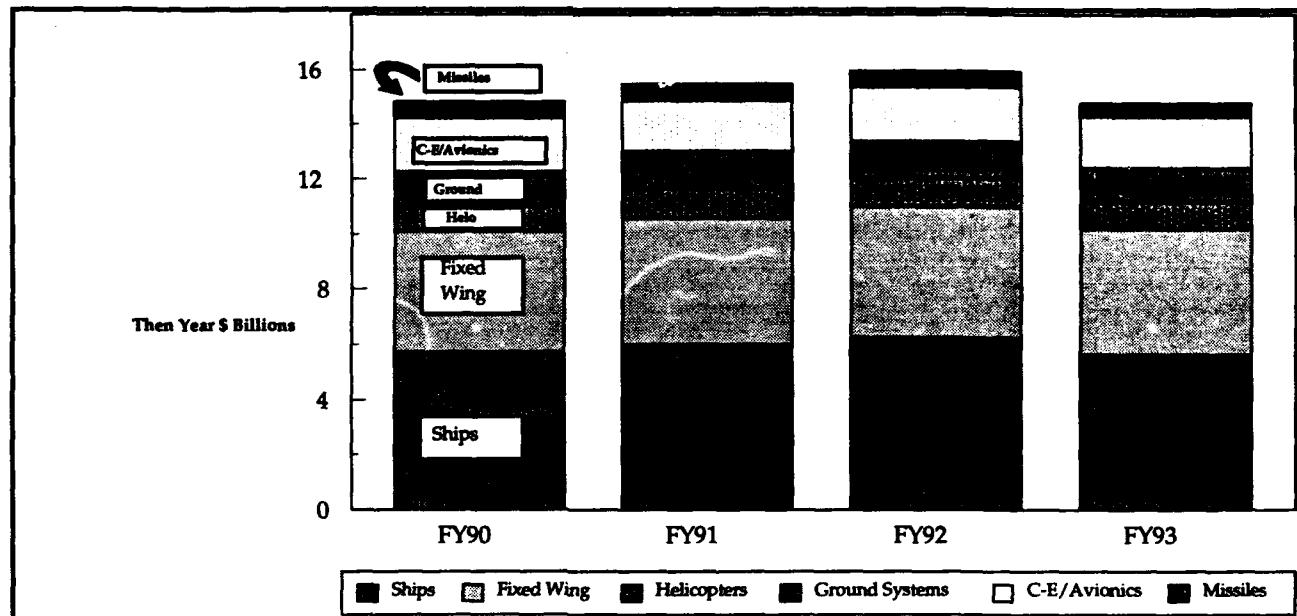


Figure C-1
DoD Depot Workloads Organic and Contract

Table C-1
JOINT SERVICE TOTAL WORKLOAD
(THEN YEAR DOLLARS IN THOUSANDS)

WBS	FY90	FY91	FY92	FY93
FIXED-WING				
Fighter/Bomber/Attack	2,205,494	2,331,523	2,381,901	2,037,853
Transport/Tankers	1,115,151	1,211,756	1,354,794	1,512,238
All Other Fixed-Wing	1,028,637	1,053,780	1,014,417	1,051,862
FIXED-WING TOTAL	4,349,282	4,597,059	4,751,112	4,601,953
GROUND				
Helicopters	929,098	1,084,625	1,043,095	1,032,945
Combat Vehicles/Artillery	534,973	590,386	680,528	552,660
Automotive/Construction	170,460	161,461	164,294	146,545
	231,066	276,655	223,782	212,480
Ordnance/Weapons/Munitions				
All Other Ground	304,242	307,535	290,785	307,271
GROUND TOTAL	2,169,840	2,420,662	2,402,484	2,251,901
ELECTRONICS/MISSILES				
Strategic Missiles	223,175	232,073	234,531	209,549
Tactical Missiles	375,781	407,566	411,291	308,579
Communications-Electronics	575,322	542,525	596,493	640,161
Avionics	1,394,205	1,397,557	1,398,430	1,299,303
Army/NAVSEA				
Contract Software Support	56,500	79,100	71,100	81,600
ELECTRONICS/MISSILES TOTAL	2,624,983	2,658,821	2,711,845	2,539,191
SEA SYSTEMS				
Aircraft Carriers	750,508	1,084,278	1,229,885	1,156,859
Submarines	1,935,154	1,407,810	1,370,165	1,406,601
All Other Ships	2,075,864	2,768,908	2,856,770	2,247,287
Components/Other	914,819	704,525	751,686	791,285
SEA SYSTEMS TOTAL	5,676,345	5,965,521	6,208,506	5,602,031
GRAND TOTAL	14,820,450	15,642,063	16,073,947	14,995,077

Split Between Public Sector and Private Sector:

Data (then year dollars) is presented at Table C-2 providing workload totals for the public sector and at Table C-3 for the private sector. The public sector share by fiscal year is 67 percent for 1990, 66 percent for 1991, 67 percent for fiscal year 1992, and 71 percent for fiscal year 1993.

Figure C-4 provides a portrayal of public sector workload value (then year dollars) share by service including DLA. Though the Army, Navy and Air Force show some variation from the DoD averages, the most dramatic variations are with the Marine Corps and DLA statistics. The Marine Corps data reflects less than five percent of its workload being performed by contract and virtually none of the DLA workload goes to the private sector. Figures C-5 and C-6 respectively provide graphic portrayals of public sector and private sector workload value (then year dollars) for each of the weapon system groupings.

A review of the percentages of public sector workload for each commodity grouping by fiscal year along with their overall absolute value indicates that ships and fixed wing are the workload share drivers:

<u>Commodity Group (Percentage)</u>	<u>FY90</u>	<u>FY91</u>	<u>FY92</u>	<u>FY93</u>
Fixed Wing	68	66	65	67
Ground	69	66	74	77
Electronics/Missiles	62	63	64	67
Ships	68	67	68	72

- The trend of the share of public sector workload value for fiscal years 1990 through 1993 is upward.

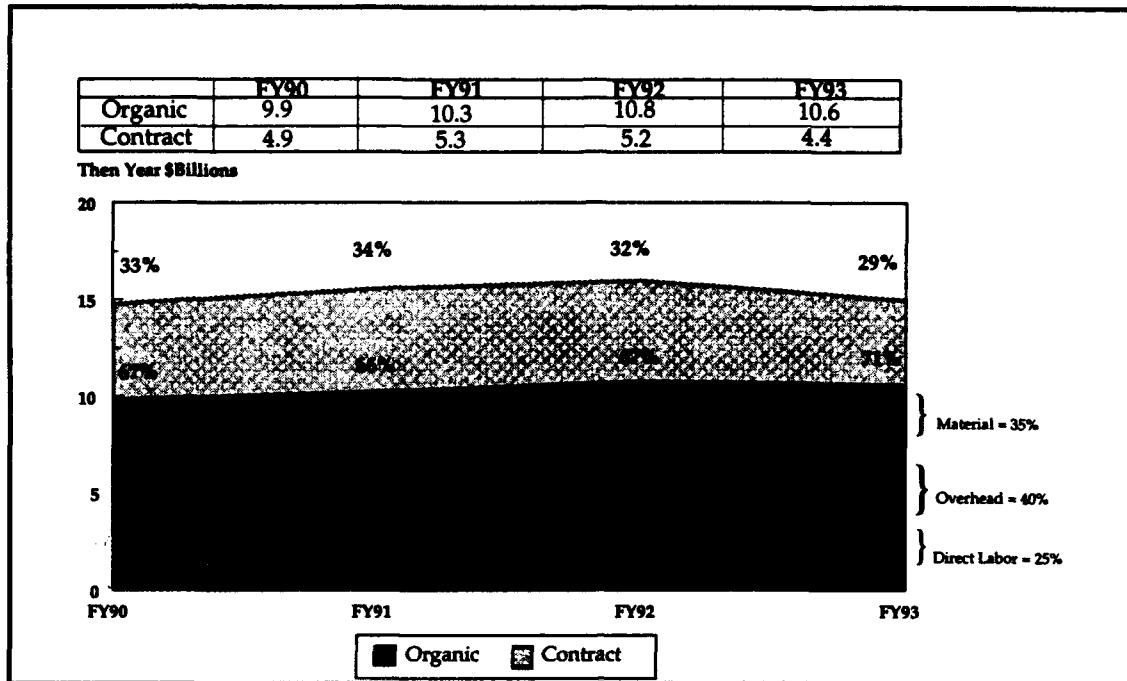


Figure C-2
Depot Maintenance Workloads FY1990-1993

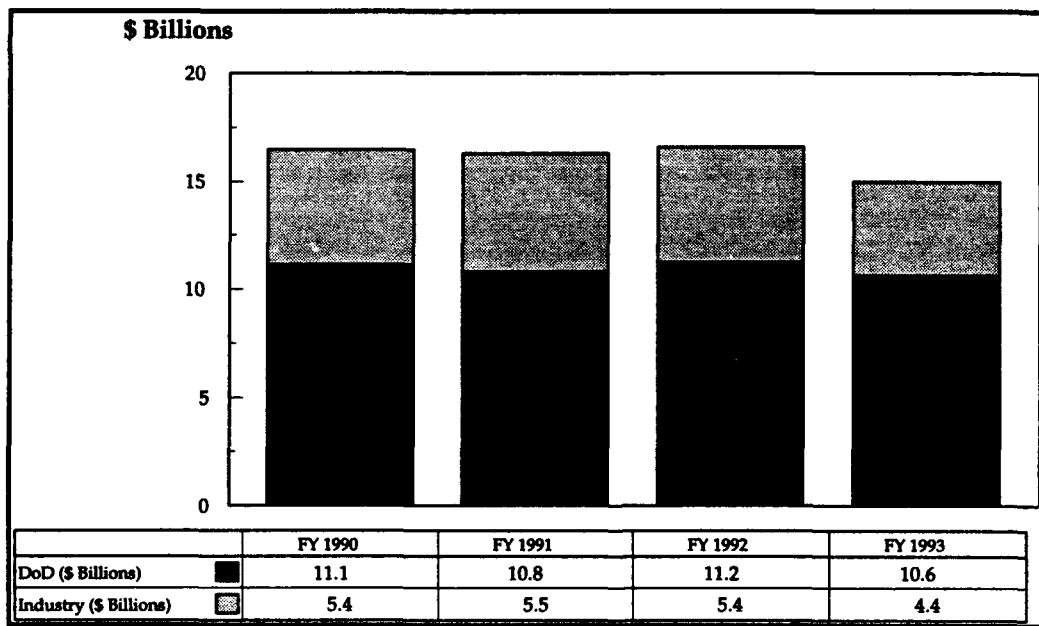


Figure C-3
Depot Level Workload FY1990-1993
Expressed in Constant 1993 DOLLARS

Table C-2
JOINT SERVICE ORGANIC WORKLOAD
(THEN YEAR DOLLARS IN THOUSANDS)

WBS	FY90	FY91	FY92	FY93
FIXED-WING				
Fighter/Bomber/Attack	1,605,925	1,711,365	1,745,060	1,632,917
Transport/Tankers	568,109	558,799	669,476	738,508
All Other Fixed-Wing	765,504	769,448	671,109	730,641
FIXED-WING TOTAL	2,939,538	3,039,612	3,085,645	3,102,066
GROUND				
Helicopters	546,746	584,646	703,168	724,086
Combat Vehicles/Artillery	417,973	461,386	558,528	509,660
Automotive/Construction	143,457	146,459	159,292	137,543
	200,210	214,879	194,528	187,229
Ordnance/Weapons/Munitions				
All Other Ground	188,774	187,728	162,493	172,203
GROUND TOTAL	1,497,161	1,595,098	1,778,009	1,730,721
ELECTRONICS/MISSILES				
Strategic Missiles	91,145	96,111	94,391	84,608
Tactical Missiles	226,624	236,191	266,177	213,628
Communications-Electronics	387,283	389,252	430,099	416,754
Avionics	909,884	955,673	953,917	978,366
ELECTRONICS/MISSILES	1,614,936	1,677,227	1,744,584	1,693,356
TOTAL				
SEA SYSTEMS				
Aircraft Carriers	690,008	996,078	798,285	739,959
Submarines	1,884,054	1,394,510	1,302,465	1,327,101
All Other Ships	553,764	1,115,608	1,596,570	1,343,187
Components/Other	744,019	511,425	533,186	644,585
SEA SYSTEMS TOTAL	3,871,845	4,017,621	4,230,506	4,054,831
GRAND TOTAL	9,923,480	10,329,558	10,838,743	10,580,974

Table C-3
JOINT SERVICE CONTRACT WORKLOAD
(THEN YEAR DOLLARS IN THOUSANDS)

WBS	FY90	FY91	FY92	FY93
FIXED-WING				
Fighter/Bomber/Attack	599,569	620,158	636,841	404,936
Transport/Tankers	547,042	652,957	685,318	773,730
All Other Fixed-Wing	263,133	284,332	343,308	321,221
FIXED-WING TOTAL	1,409,744	1,557,447	1,665,467	1,499,887
GROUND				
Helicopters	382,352	499,979	339,927	308,859
Combat Vehicles/Artillery	117,000	129,000	122,000	43,000
Automotive/Construction	27,003	15,002	5,002	9,002
	30,856	61,776	29,254	25,251
Ordnance/Weapons/Munitions				
All Other Ground	115,468	119,807	128,292	135,068
GROUND TOTAL	672,679	825,564	624,475	521,180
ELECTRONICS/MISSILES				
Strategic Missiles	132,030	135,962	140,140	124,941
Tactical Missiles	149,157	171,375	145,114	951
Communications-Electronics	188,038	153,273	166,395	406
Avionics	484,321	441,884	444,513	3,337
Army/NAVSEA				
Contract Software Support	56,500	79,100	71,100	81,600
ELECTRONICS/MISSILES TOTAL	1,010,046	981,594	967,262	845,835
SEA SYSTEMS				
Aircraft Carriers	60,500	88,200	431,600	416,900
Submarines	51,100	13,300	67,700	79,500
All Other Ships	1,522,100	1,653,300	1,260,200	904,100
Components/Other	170,800	193,100	218,500	146,700
SEA SYSTEMS TOTAL	1,804,500	1,947,900	1,978,000	1,547,200
GRAND TOTAL	4,896,969	5,312,505	5,235,204	4,414,102

PUBLIC SECTOR COST AS A PERCENT OF TOTAL DEPOT MAINTENANCE COST BY FISCAL YEAR

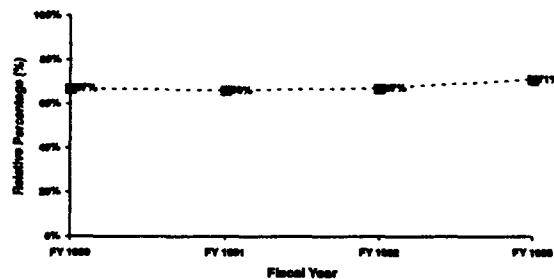
Figure C-4

Organic Costs As A % Of Total Depot Maintenance Costs By Fiscal Year

30-Mar-04

Fiscal Year	Organic Costs (\$000s)	Contract Costs (\$000s)	Total Costs (\$000s)
FY 1990	\$8,288,470	\$4,886,980	\$14,880,440
FY 1991	\$10,282,500	\$6,312,806	\$16,592,086
FY 1992	\$10,988,744	\$6,325,204	\$16,073,948
FY 1993	\$10,880,975	\$4,414,102	\$14,995,077

Organic Costs As A % Of Total Costs By Fiscal Year



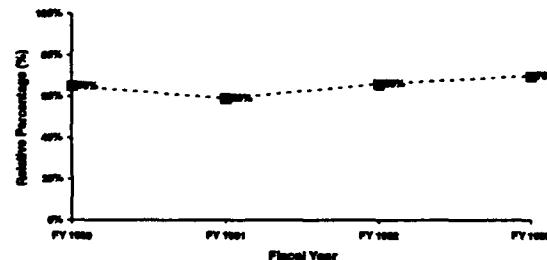
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Page 1

Army

Fiscal Year	Organic Costs (\$000s)	Contract Costs (\$000s)	Total Costs (\$000s)
FY 1990	\$1,237,100	\$708,000	\$2,045,100
FY 1991	\$1,285,000	\$802,000	\$2,087,000
FY 1992	\$1,469,400	\$760,000	\$2,229,400
FY 1993	\$1,284,200	\$878,000	\$2,162,200

Organic Costs As A % Of Total Costs By Fiscal Year



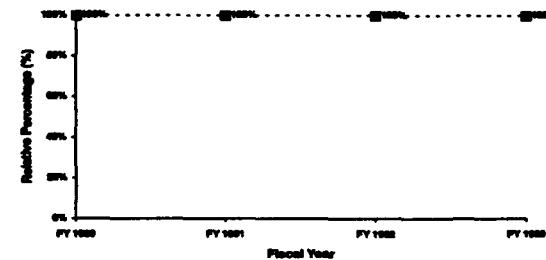
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Page 2

DLA

Fiscal Year	Organic Costs (\$000s)	Contract Costs (\$000s)	Total Costs (\$000s)
FY 1990	\$17,300		\$17,300
FY 1991	\$18,091		\$18,091
FY 1992	\$18,271		\$18,271
FY 1993	\$18,300		\$18,300

Organic Costs As A % Of Total Costs By Fiscal Year

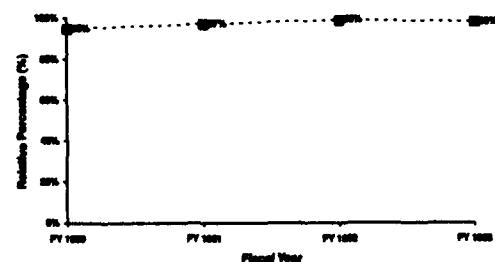


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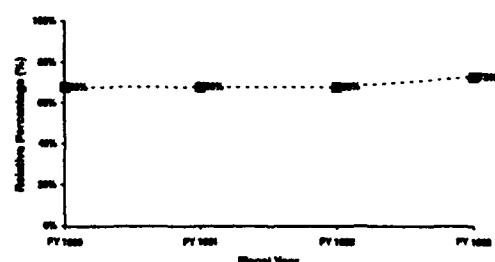
Page 2

Marine Corps

Fiscal Year	Organic Costs (\$MM)	Contract Costs (\$MM)	Total Costs (\$MM)
PY 1999	\$167.807	\$8,516	\$176,323
PY 2000	\$169.147	\$8,288	\$177,435
PY 2001	\$161.160	\$8,005	\$169,164
PY 2002	\$169.400	\$8,214	\$177,614

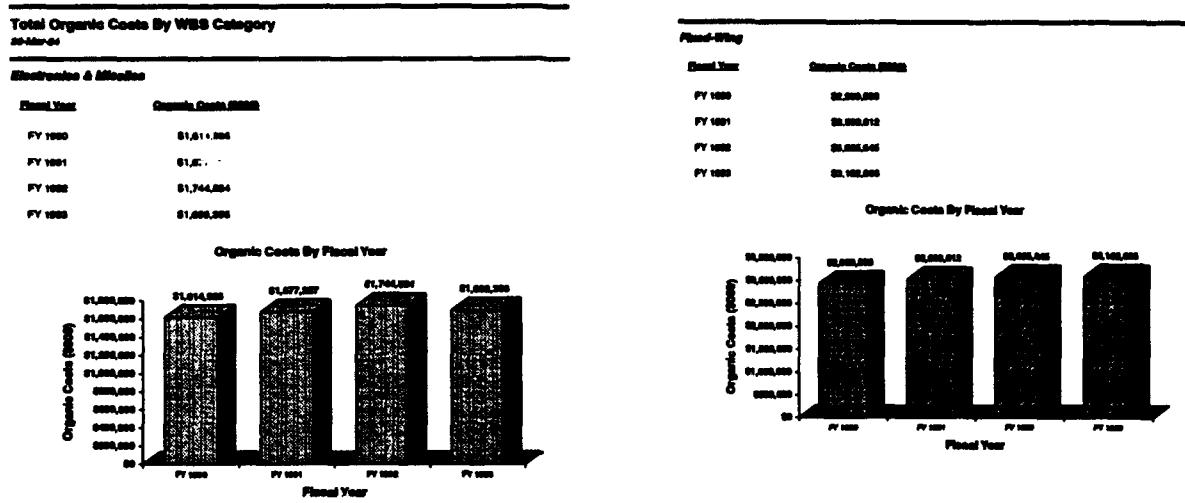
Organic Costs As A % Of Total Costs By Fiscal Year**Navy**

Fiscal Year	Organic Costs (\$MM)	Contract Costs (\$MM)	Total Costs (\$MM)
PY 1999	\$8,040.000	\$2,057.251	\$10,097.251
PY 2000	\$8,712.214	\$2,071.167	\$10,783.381
PY 2001	\$8,776.045	\$2,045.000	\$10,821.045
PY 2002	\$8,464.000	\$2,068.044	\$10,532.044

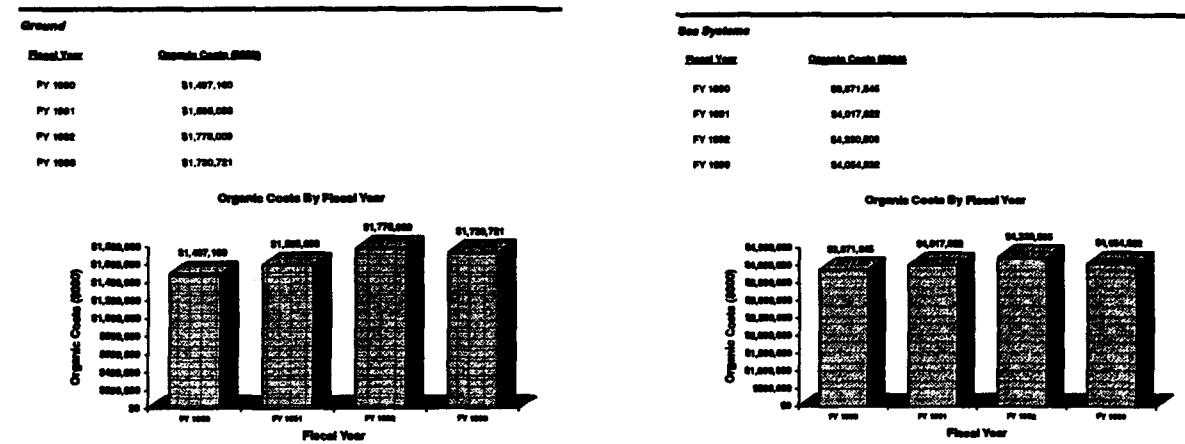
Organic Costs As A % Of Total Costs By Fiscal Year

DISTRIBUTION BY WEAPON SYSTEM GROUPS PUBLIC SECTOR WORKLOAD

Figure C-5



Total Organic Costs By WSS Category 20-Mar-94 Page 1



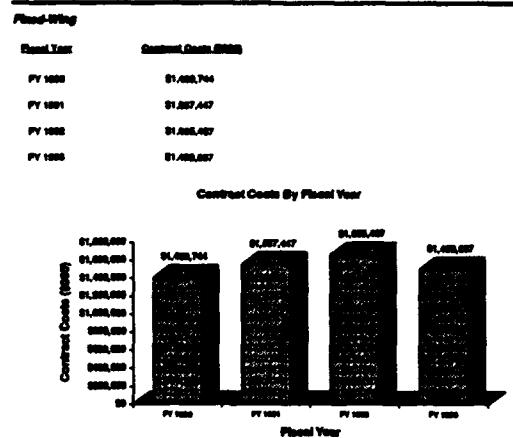
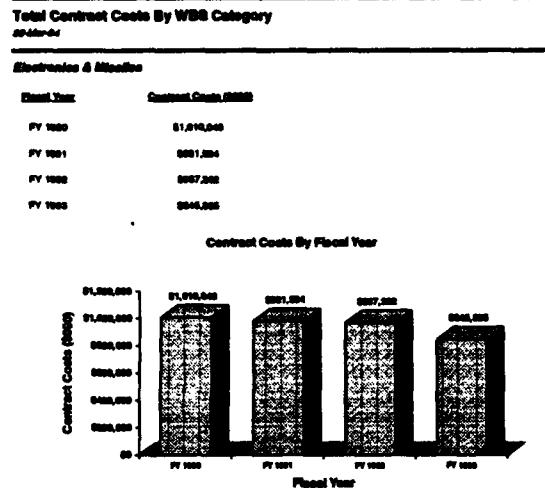
Total Organic Costs By WSS Category 20-Mar-94 Page 2

Total Organic Costs By WSS Category 20-Mar-94 Page 3

DISTRIBUTION BY WEAPON SYSTEM GROUPS

PRIVATE SECTOR WORKLOAD

Figure C-6

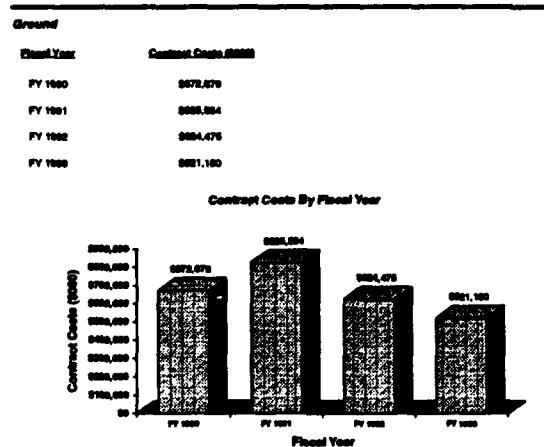


Total Contract Costs By WBS Category SP-44-04

Page 1

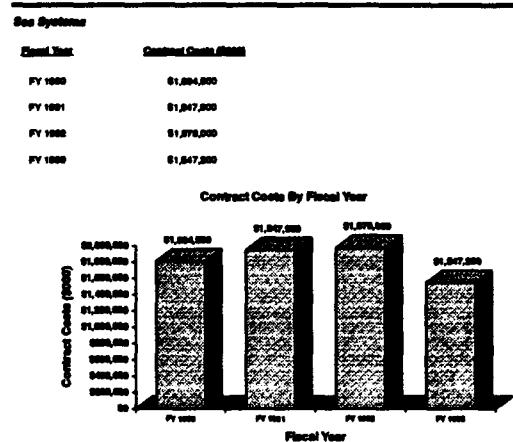
Total Contract Costs By WBS Category SP-44-04

Page 2



Total Contract Costs By WBS Category SP-44-04

Page 3



Total Contract Costs By WBS Category SP-44-04

Page 4

Distribution of Workload by Service:

Tables C-4 through C-8 provide workload total value for fiscal years 1990 through 1993 for each of the services (including DLA). The respective workload share (both public sector and private sector) is as follows:

<u>Service (Percentage)</u>	<u>FY90</u>	<u>FY91</u>	<u>FY92</u>	<u>FY93</u>
Army	14	15	14	13
Air Force	25	25	25	27
Marine Corps	1	1	1	1
Navy	60	59	60	59
DLA	.1	.1	.1	.1

The Navy share of the total value of depot maintenance workload is much larger than all other services combined. Of the total Navy workload, almost one-third is managed by NAVAIR and almost two-thirds is managed by NAVSEA, primarily for public and private shipyard workload.

Public Sector Workload Expressed in Direct Labor Hours:

Table C-9 provides public sector workload data in direct labor hours for fiscal years 1990 through 1993. Figure C-7 compares the service direct labor hour data (including DLA) to the corresponding public sector workload value by fiscal year. The overall trend for the private sector seems to indicate that while cost remains relatively stable, the amount of direct labor hours expended is reducing.

Table C-4
ARMY TOTAL WORKLOAD
(THEN YEAR DOLLARS IN THOUSANDS)

WBS	FY90	FY91	FY92	FY93
FIXED-WING				
Fighter/Bomber/Attack				
Transport/Tankers				
All Other Fixed-Wing	71,000	92,200	114,400	99,700
FIXED-WING TOTAL	71,000	92,200	114,400	99,700
GROUND				
Helicopters	573,000	702,300	569,100	516,800
Combat Vehicles/Artillery	488,600	541,300	600,200	477,400
Automotive/Construction	150,900	137,600	112,800	83,100
	45,300	73,600	35,300	16,600
Ordnance/Weapons/Munitions				
All Other Ground	60,800	53,400	40,800	50,400
GROUND TOTAL	1,318,600	1,508,200	1,358,200	1,144,300
ELECTRONICS/MISSILES				
Strategic Missiles				
Tactical Missiles	271,000	299,600	330,100	231,300
Communications-Electronics	294,300	277,800	322,300	286,500
Avionics	48,200	48,700	55,400	63,400
Army Contract Software	37,000	65,000	68,000	72,000
Support				
ELECTRONICS/MISSILES	650,500	691,100	775,800	653,200
TOTAL				
SEA SYSTEMS				
Aircraft Carriers				
Submarines				
All Other Ships	5,000	6,000	11,000	5,000
Components/Other				
SEA SYSTEMS TOTAL	5,000	6,000	11,000	5,000
GRAND TOTAL	2,045,100	2,297,500	2,259,400	1,902,200

Table C-5
AIR FORCE TOTAL WORKLOAD
(THEN YEAR DOLLARS IN THOUSANDS)

WBS	FY90	FY91	FY92	FY93
FIXED-WING				
Fighter/Bomber/Attack	1,430,828	1,455,062	1,420,160	1,324,247
Transport/Tankers	989,033	1,130,290	1,245,112	1,413,907
All Other Fixed-Wing	244,638	251,260	292,584	309,670
FIXED-WING TOTAL	2,664,499	2,836,612	2,957,856	3,047,824
GROUND				
Helicopters	7,592	5,843	5,432	8,565
Combat Vehicles/Artillery				
Automotive/Construction	491	527	422	386
	18,610	19,550	19,744	18,645
Ordnance/Weapons/Munitions				
All Other Ground	150,887	152,645	156,023	166,812
GROUND TOTAL	177,580	178,565	181,621	194,408
ELECTRONICS/MISSILES				
Strategic Missiles	141,113	137,088	124,539	104,363
Tactical Missiles	3,429	3,685	3,932	3,589
Communications-Electronics	209,366	183,703	181,773	274,644
Avionics	592,871	573,990	548,604	486,042
ELECTRONICS/MISSILES				
TOTAL	946,779	898,466	858,848	868,638
SEA SYSTEMS				
Aircraft Carriers				
Submarines				
All Other Ships				
Components/Other				
SEA SYSTEMS TOTAL				
GRAND TOTAL	3,788,858	3,913,643	3,998,325	4,110,870

Table C-6
MARINE CORPS TOTAL WORKLOAD
(THEN YEAR DOLLARS IN THOUSANDS)

WBS	FY90	FY91	FY92	FY93
FIXED-WING				
Fighter/Bomber/Attack				
Transport/Tankers				
All Other Fixed-Wing				
FIXED WING TOTAL				
GROUND				
Helicopters				
Combat Vehicles/Artillery	45,971	46,434	77,195	72,429
Automotive/Construction	19,069	23,334	51,072	63,059
	2,917	4,035	4,328	6,328
Ordnance/Weapons/Munitions				
All Other Ground	14,191	20,269	10,584	12,205
GROUND TOTAL	82,148	94,072	143,179	154,021
ELECTRONICS/MISSILES				
Strategic Missiles				
Tactical Missiles	10,672	10,932	12,154	8,606
Communications-Electronics	20,223	22,501	28,531	30,481
Avionics				
ELECTRONICS/MISSILES TOTAL	30,895	33,433	40,685	39,087
SEA SYSTEMS				
Aircraft Carriers				
Submarines				
All Other Ships				
Components/Other				
SEA SYSTEMS TOTAL				
GRAND TOTAL	113,043	127,505	183,864	193,108

Table C-7
NAVY TOTAL WORKLOAD
(THEN YEAR DOLLARS IN THOUSANDS)

WBS	FY90	FY91	FY92	FY93
FIXED-WING				
Fighter/Bomber/Attack	774,666	876,461	961,741	713,606
Transport/Tankers	126,118	81,466	109,682	98,331
All Other Fixed-Wing	712,999	710,320	607,433	642,492
FIXED-WING TOTAL	1,613,783	1,668,247	1,678,856	1,454,429
GROUND				
Helicopters	348,506	376,482	468,563	507,580
Combat Vehicles/Artillery	402	2,652	3,133	2,831
Automotive/Construction	164,239	179,470	164,410	170,907
Ordnance/Weapons/Munitions	60,968	66,130	67,107	58,554
All Other Ground	574,116	624,734	703,213	739,872
GROUND TOTAL				
ELECTRONICS/MISSILES				
Strategic Missiles	82,062	94,985	109,992	105,186
Tactical Missiles	90,680	93,349	65,105	65,084
Communications-Electronics	51,432	58,521	63,890	48,535
Avionics	753,134	774,867	794,426	749,861
NAVSEA Contract Software	19,500	14,100	3,100	9,600
Support				
ELECTRONICS/MISSILES TOTAL	996,808	1,035,822	1,036,513	978,266
SEA SYSTEMS				
Aircraft Carriers	750,508	1,084,278	1,229,885	1,156,859
Submarines	1,935,154	1,407,810	1,370,165	1,406,601
All Other Ships	2,070,864	2,762,908	2,845,770	2,242,287
Components/Other	914,819	704,525	751,686	791,285
SEA SYSTEMS TOTAL	5,671,345	5,959,521	6,197,506	5,597,031
GRAND TOTAL	8,856,052	9,288,324	9,616,087	8,769,598

Table C-8
DEFENSE LOGISTICS AGENCY TOTAL WORKLOAD
(THEN YEAR DOLLARS IN THOUSANDS)

WBS	FY90	FY91	FY92	FY93
FIXED-WING				
Fighter/Bomber/Attack				
Transport/Tankers				
All Other Fixed-Wing				
FIXED WING TOTAL				
GROUND				
Helicopters				
Combat Vehicles/Artillery				
Automotive/Construction				
Ordnance/Weapons/Munitions				
All Other Ground	17,396	15,091	16,271	19,300
GROUND TOTAL	17,396	15,091	16,271	19,300
ELECTRONICS/MISSILES				
Strategic Missiles				
Tactical Missiles				
Communications-Electronics				
Avionics				
ELECTRONICS/MISSILES TOTAL				
SEA SYSTEMS				
Aircraft Carriers				
Submarines				
All Other Ships				
Components/Other				
SEA SYSTEMS TOTAL				
GRAND TOTAL	17,396	15,091	16,271	19,300

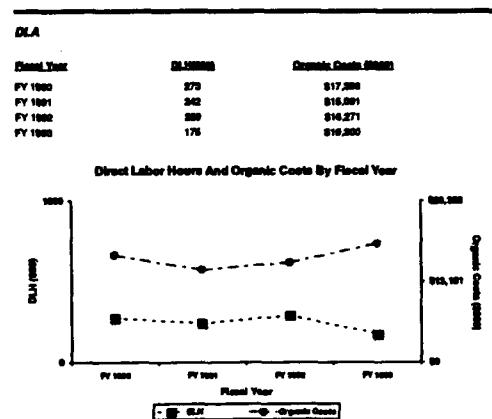
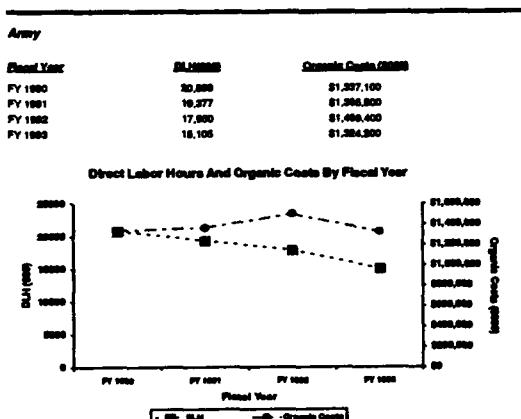
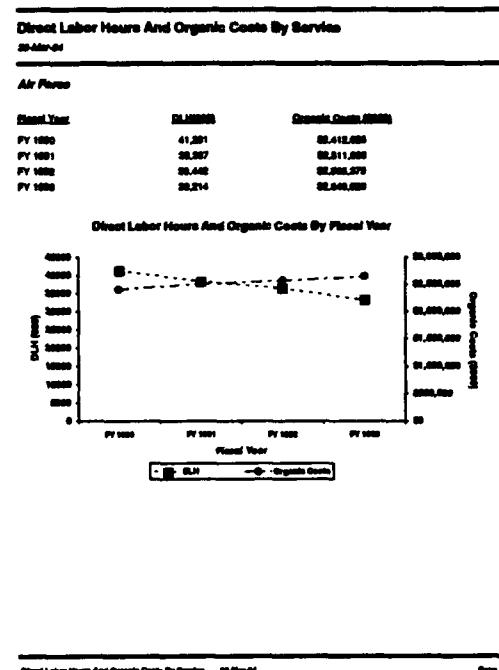
DIRECT LABOR HOURS AND COSTS BY FISCAL YEAR

Figure C-7

DoD Total 20-Mar-04		
Board Year	DLH (000s)	Organic Costs (\$000s)
FY 1990	168,748	\$9,885,470
FY 1991	140,853	\$10,388,580
FY 1992	154,125	\$10,695,744
FY 1993	130,934	\$10,690,975

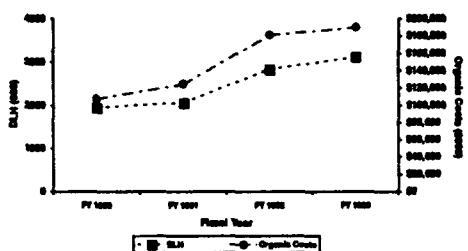
Direct Labor Hours And Organic Costs By Fiscal Year

Fiscal Year	DLH (000s)	Organic Costs (\$000s)
FY 1990	168,748	9,885,470
FY 1991	140,853	10,388,580
FY 1992	154,125	10,695,744
FY 1993	130,934	10,690,975



Marine Corps

Plant Year	DL Hours	Organic Costs (\$000)
PY 1990	1,000	\$167,027
PY 1991	2,000	\$124,147
PY 1992	2,000	\$101,160
PY 1993	3,110	\$109,002

Direct Labor Hours And Organic Costs By Fiscal Year

Navy

Plant Year	DL Hours	Organic Costs (\$000)
PY 1990	94,340	\$0,000,000
PY 1991	95,001	\$0,014,216
PY 1992	96,000	\$0,076,000
PY 1993	95,911	\$0,004,000

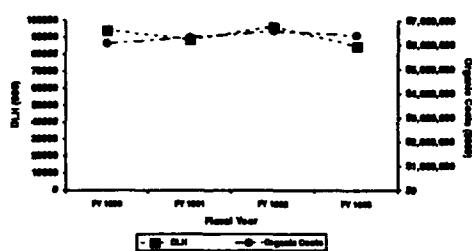
Direct Labor Hours And Organic Costs By Fiscal Year

Table C-9
JOINT SERVICE ORGANIC WORKLOAD
(DLH's IN THOUSANDS)

WBS	FY90	FY91	FY92	FY93
FIXED-WING				
Fighter/Bomber/Attack	24,811	23,686	22,527	19,197
Transport/Tankers	9,499	8,683	9,194	9,372
All Other Fixed-Wing	8,845	8,397	6,828	6,919
FIXED-WING TOTAL	43,155	40,766	38,549	35,488
GROUND				
Helicopters	6,949	6,872	7,241	6,499
Combat Vehicles/Artillery	5,999	5,715	6,621	6,307
Automotive/Construction	2,516	2,169	2,268	2,054
Ordnance/Weapons/Munitions	3,947	4,149	3,753	3,483
All Other Ground	3,105	2,932	2,329	2,183
GROUND TOTAL	22,516	21,837	22,212	20,526
ELECTRONICS/MISSILES				
Strategic Missiles	1,890	1,752	1,580	1,241
Tactical Missiles	3,706	3,462	3,367	2,514
Communications-Electronics	6,841	6,670	6,398	5,446
Avionics	13,114	12,427	11,725	10,386
ELECTRONICS/MISSILES TOTAL	25,551	24,311	23,070	19,587
SEA SYSTEMS				
Aircraft Carriers	11,992	15,271	13,198	11,145
Submarines	32,744	21,380	21,534	19,988
All Other Ships	9,624	17,104	26,397	20,230
Components/Other	13,166	8,184	9,160	9,960
SEA SYSTEMS TOTAL	67,526	61,939	70,289	61,323
GRAND TOTAL	158,748	148,853	154,120	136,924

OBSERVATIONS

Data Collection Was Difficult:

The services rejected use of the standard DoD cost reporting system for depot maintenance workload because it was unreliable and they could not certify the data as required by OSD. Additionally, the DoD 7220.9-M data does not reflect actual production execution data, but rather financial completions. Because the DoD standard system was rejected by the service, data collection was extremely difficult, requiring a complex data call. Response time was protracted and many revisions and corrections were required.

Financial and Production Systems Not Standard:

It was very unfortunate that the DoD 7220.9-M data system could not be used. It was the only standard system available. The Task Force should have been able to depend on a standard system to complete this tasking.

Conceptually, the DoD 7220.9-M data system is not that far off the mark. Its principal shortcoming is that it attempts to accomplish two contradictory things at once. It attempts to answer the following questions:

- What were unit costs?
- What were workloads for a fiscal year?

Both are valid questions but they cannot be accomplished at the same time with the same data set. Costs that are collected to develop unit cost data usually span two or more fiscal years. Determining actual workloads accomplished in a year requires accrual of executed expensing for that fiscal year. Therefore, two data sets or data files are required to accomplish both.

Common Financial And Production Systems Are Required:

A common system is needed for collecting and displaying all DoD and industry depot maintenance costs. Unlike the single data set used by DoD 7220.9-M, the new common data system needs to collect two data sets. The first set should be all financially completed orders for a fiscal year so that unit cost data can be obtained. The second set should be actual program execution/expensing for a fiscal year (unrelated to financially completed orders) so that actual workload performed can be expressed. Both files would be structured by expense element (identify components of cost), by appropriation, by customer, by work performance category, and by work breakdown structure. The method for implementing this requirement must be part of standard DoD data systems, not an add on reporting requirement like current DoD 7220.9-M.

CONCLUSIONS

Collection of data for this task was very complex and difficult. A number of existing data systems contained some of the information that was required, but no single source reliably contained all information required. The financial systems are built around tracking obligations and do not easily lend themselves to reporting workload oriented data. Depot maintenance program execution systems used by the services are each different.

Workload data for fiscal years 1990 through 1993 reflects that the organic share of DoD workload is increasing. It bears mentioning that policy changes currently underway to focus public sector workload on the new depot maintenance Core philosophy will not show any significant impact until workload execution statistics are reported for fiscal year 1996.

RECOMMENDATIONS

A common system for collecting and displaying all DoD and industry depot maintenance costs should be developed. This will pose no added reporting requirement for industry since the responsible Government requiring activity would report industry data as is the practice today. This will, however, require both public and private sector activities to revise current cost and production collection systems to a uniform format. This requirement should be integral to the ongoing standardization initiatives being undertaken by the Joint Logistics Systems Center and the Defense Finance and Accounting Service.

APPENDIX D

DEPOT LEVEL MAINTENANCE CAPACITY

TASK 2: An estimate of the current capacity to carry out the performance of depot-level maintenance workloads by employees of the Department of Defense and non-Federal Government personnel.

APRIL 1994

**DEFENSE SCIENCE BOARD
DEPOT MAINTENANCE MANAGEMENT TASK FORCE**

TASK 2: An estimate of the current capacity to carry out the performance of depot-level maintenance workloads by employees of the Department of Defense and by non-Federal Government personnel.

OVERVIEW

For many years, one continuing theme in the statements of the General Accounting Office, the DoD Inspector General and Congressional committees is that there is excess capacity in the public sector depots. Currently, approved base closure actions will reduce the number of major depots from 35 to 24. The data collected in support of this task indicate that current DoD expectations that additional closures will be required in the 1995 round of the Base Realignment and Closure (BRAC) process are well founded.

The tasking above, requires an estimate of DoD and private sector capacity, to accomplish depot-level maintenance workloads. In the time that was available to accomplish this task, it was not possible to establish any new and comprehensive process to estimate capacity. Both DoD and industry representatives agreed to separate approaches to obtain what is a comparable estimate from each sector. Public sector depot capacity and utilization were based on the latest data collected in accordance with current DoD capacity measurement policy. It is based on the number of physical work positions identified and the number of direct labor productive hours each position is capable of producing in peacetime. Also assumed, is a one shift, eight hour day, five days a week. Private sector capacity includes both capacity currently devoted to depot maintenance operations and production capacity that could also be utilized for depot maintenance. It uses the economic concept of "rated capacity" or the maximum annual plant output of a particular company.

Three important statistics were selected for use by the Task Force: 1) workload expressed in direct labor hours, 2) capacity index in direct labor hours, and 3) utilization index, which is the quotient of workload and capacity expressed as a percent.

Public sector capacity and utilization data was collected for each depot maintenance facility. For this task, data collected for 1994 and 1997 will be portrayed. The 1994 data is equivalent to that collected by industry. The 1997 data is reported to show the impact of currently approved base closure actions, but not necessarily the impact of the new Core policy. Looking at the aggregate statistics masks many import trends in the public sector.

Fiscal Year	Workload (DLH 000)	Capacity (DLH 000)	Utilization (%)
1994	122,177	159,914	76%
1997	95,608	118,301	81%

Specifically, Army utilization changes from 57 percent in 1994 to 72 percent in 1997, Air Force from 86 to 83, Marine Corps from 125 to 116, NAVAIR from 74 to 103, and NAVSEA shipyards from 75 to 76. Even these statistics are very misleading. For example, even though NAVSEA shipyard capacity utilization appears relatively constant, large capacity divestiture (closing three shipyards) is being offset by dramatic drops in workload (from 13 million direct labor hours to 10 million).

Industry capacity data was provided by commodity grouping and by weapon system category. An examination of the data provided by commodity grouping validates that there is also a large amount of excess capacity in industry. Note that this 1994 data contains production capacity that may also be used for maintenance. Also, workload quantities include new production.

<u>Commodity Group</u>	<u>Workload (DLH 000)</u>	<u>Capacity (DLH 000)</u>	<u>Utilization (Percent)</u>	<u>Public Sector Workload (DLH 000) (1993)</u>
Fixed Wing	167,181	379,109	44%	35,488
Ground Systems	23,434	69,609	34%	20,526
C-E and Missiles	104,302	269,157	39%	19,587
Sea Systems	134,051	212,687	63%	61,323

A more careful examination of the weapon system categories that make up each commodity group reveals that the overall percentages for Fixed Wing and for Sea Systems are representative. The C-E and Missile data varies widely: strategic missiles - 24 percent, tactical missiles - 59 percent, C-E - 37 percent, and avionics - 45 percent. The Ground Systems data also varies widely: helicopters - 36 percent, combat vehicles/artillery - 25 percent, ordnance/weapons/munitions - 75 percent, and all other - 35 percent.

Examining the private sector data and comparing it to the actual 1993 public sector workload information collected in Task 1 yields one other important point. Even if it were possible to put every bit of public sector workload into the private sector (and it is certainly not possible for a wide variety of reasons), there would still remain a very large amount of excess capacity in industry. And in most cases the 1993 public sector workload data overstates what the expected future year workload will be.

Finally, at the end of this paper, appropriate conclusions and recommendations will be presented.

DISCUSSION

Methodology

In the time available to accomplish this task, it was not possible to establish any new and comprehensive process to estimate capacity. Both DoD and industry representatives agreed to separate approaches to obtain what is a comparable estimate of capacity for each sector. Three statistics were selected for use by the Task Force: 1) workload expressed in direct labor hours, 2) capacity index in direct labor hours, and 3) utilization index.

The Public Sector Used Existing Capacity Data:

Public sector depot capacity and utilization were based on the latest data collected in accordance with current DoD capacity measurement policy. This policy is based on the December 5, 1990 Joint Logistics Commanders *Capacity Measurement Improvement Study Report* which recommended specific changes to DoD 4151.15H, *DoD Maintenance Production Shop Capacity Measurement Handbook*. Even though the handbook was subsequently canceled by DoD Directive 4151.18, *Maintenance of Military Materiel* which authorized the issuance of a new handbook not yet approved, the Services have used the Assistant Secretary of Defense (Production and Logistics) policy letter of January 25, 1991 for guidance. This policy letter specifically authorizes the use of standard factors for direct labor personnel and for availability. It also endorses deriving capacity in terms of direct labor hours based on work positions.

The currently developed organic capacity data is based on the number of physical work positions identified and the number of direct labor productive hours each position is capable of producing in peacetime. Also assumed is a one shift, eight hour day, five days a week. At the time of this tasking, the services were updating and recomputing capacity and utilization data for the next edition of the *Defense Depot Maintenance Council Corporate Business Plan*. The Working Group agreed to use that data.

Utilization percentages for public depots were calculated by simply dividing workload for a specific year by the planned capacity for that year. Anticipated capacity changes such as military construction, base closure, and removal of production assets from the inventory are included in the 1997 projections.

The Private Sector Developed A Special Data Call:

A capacity worksheet was used by industry to collect data from those industries involved or likely to be involved in depot-level maintenance. One hundred ten separate data inputs were received from 62 companies. A detailed explanation of the methodology for derivation of the industry "Current Capacity" measurement is

provided at page D-a-1 of this appendix.

The methodology for "Current Capacity" for depot-level maintenance in industry uses an equivalent direct labor hours calculated from "Rated Capacity" (i.e., the maximum annual plant output a particular enterprise could apply to a specific commodity), less the capacity which is incompatible with depot-level work (and not being used for production work). This includes both capacity currently devoted to depot maintenance operations and production capacity that could also be utilized for depot maintenance. "Rated Capacity" is the quotient of "Current Manning" divided by the "Utilization Factor." Like the public sector calculation, capacity utilization is calculated by dividing current workload by current capacity.

Public Sector And Industry Data Are Approximately Equivalent:

Government and industry representatives agree that the two methods used for this task provide as close to an equivalency as was possible in the time available. The DoD methodology more closely approximated the traditional industrial engineering capacity determination process, while the industry methodology is closer to that used by economists. Representatives from both sectors agreed that these capacity calculations do not provide adequate visibility to evaluate *capability* for accomplishing specific workloads.

One important variable between the public sector and industry calculations is that public sector calculations used 1615 direct labor productive hours per work position, while industry used 1800 direct labor hours per worker. An important difference between the two sectors causing this variance is the publics sector's legislatively mandated number of holidays and more generous leave entitlements.

SUMMARY OF RESPONSES

DoD Capacity Portrayal:

Figure D-1 below provides a summary of the five main aggregations of DoD capacity data. A detailed portrayal of DoD facilities with significant depot-level maintenance capability is in Table D-1 below. The Army notes that its data reflects a workload increase for fiscal year 1997 due to additional POM funding caused by reduced fiscal year 1994 funding creating an unfunded maintenance backlog. Air Force fiscal year 1997 data includes additional workload being shifted from intermediate-level maintenance to depot. Even though NAVSEA Shipyard capacity utilization appears stable, it should be noted that the closure of three shipyards and their corresponding capacity reduction is offset by a steep decline in projected fiscal year 1997 workload.

DoD currently projects an overall reduction in public sector capacity of 26 percent or about 41 million direct labor hour equivalents between 1994 and 1997. About 35 million hours of capacity are being removed from Navy depots and shipyards (NAVSEA shipyards - well over 25 million and NAVAIR - almost 9 million). These reductions are almost totally caused by BRAC. Even though the Army reduction is relatively small, about 2 million equivalent hours of capacity, it has made significant previous BRAC closures prior to 1994. The Air Force projects a capacity reduction of almost 5 million hours, only 1.1 million of which is attributed to BRAC.

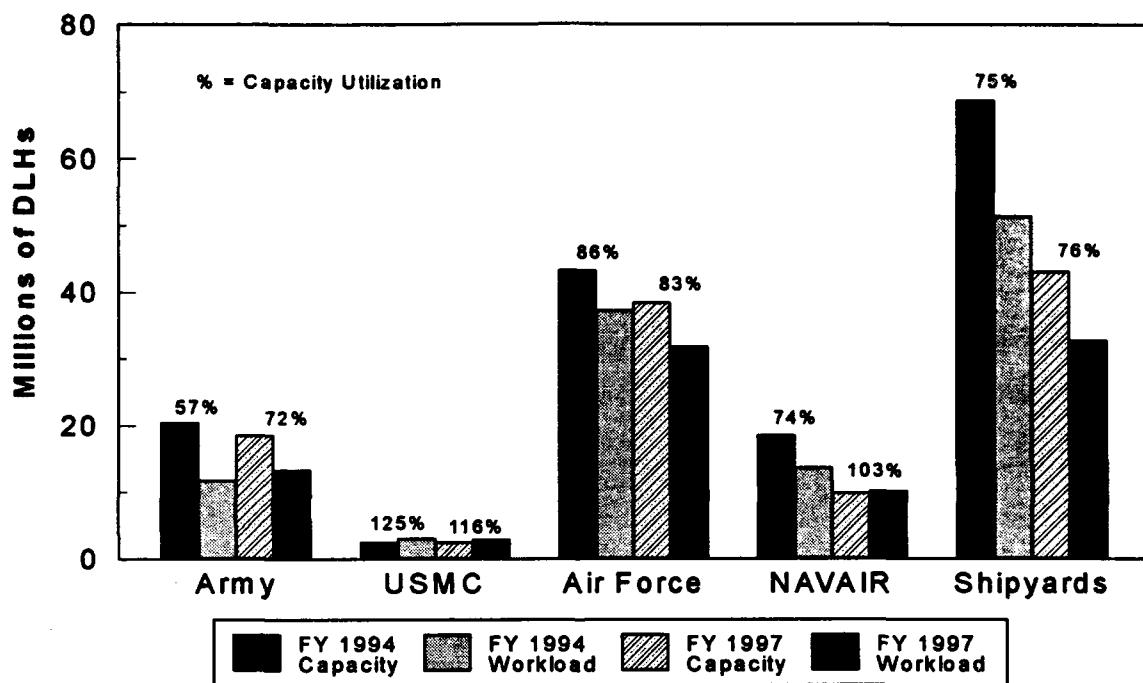


Figure D-1
DoD Organic Depot Maintenance
Capacity and Utilization

Table D-1
PUBLIC SECTOR CAPACITY UTILIZATION
(DLH's IN THOUSANDS)

ARMY

LOCATION	DLH'S	DLH'S	%	DLH'S	DLH'S	%
Anniston AD	2,054	4,278	48%	1,429	4,278	33%
Corpus Christi AD	3,010	4,394	69%	3,405	4,394	77%
Letterkenny AD	1,378	1,869	74%	2,292	1,869	123%
Red River AD	1,661	3,173	52%	2,695	3,173	85%
Tobiahanna AD	3,318	4,098	81%	3,419	4,742	72%
Tooele AD	290	2,573	11%	0	0	0%
Sacramento AD	0	0	0%	0	0	0%
ARMY TOTAL	11,711	20,385	57%	13,175	18,456	72%

NAVY

LOCATION	DLH'S	DLH'S	%	DLH'S	DLH'S	%
NADEP Alameda	1,612	3,001	54%	0	0	0%
NADEP Cherry Point	2,620	3,158	83%	2,903	3,158	92%
NADEP Jacksonville	2,497	3,062	82%	3,560	3,062	116%
NADEP Norfolk	2,274	3,404	67%	0	0	0%
NADEP North Island	2,551	3,536	72%	3,612	3,536	102%
NADEP Pensacola	2,063	2,312	89%	0	0	0%
NAVAIR TOTAL	13,617	18,473	74%	10,075	9,756	103%

**PUBLIC SECTOR CAPACITY UTILIZATION
(DLH's IN THOUSANDS)**

NAVY CONTINUED

DEPOT	2004 WORKLOAD	2004 CAPACITY	2004 UTILIZATION	2005 WORKLOAD	2005 CAPACITY	2005 UTILIZATION
NSY Portsmouth	4,928	6,974	71%	3,183	6,974	46%
NSY Philadelphia	6,056	11,144	54%	0	0	0%
NSY Norfolk	9,757	11,928	82%	9,472	11,928	79%
NSY Charleston	5,693	7,036	81%	0	0	0%
NSY Puget Sound	12,494	14,168	88%	14,092	14,168	99%
NSY Mare Island	5,845	7,518	78%	0	0	0%
NSY Long Beach	3,303	4,626	71%	2,566	4,626	55%
NSY Pearl Harbor	3,194	5,303	60%	3,377	5,303	64%
NAVAL SHIPYARD TOTAL	51,270	68,697	75%	32,690	42,999	76%

DEPOT	2004 WORKLOAD	2004 CAPACITY	2004 UTILIZATION	2005 WORKLOAD	2005 CAPACITY	2005 UTILIZATION
NWS Charleston	17	26	65%	9	26	35%
NWS Concord	53	88	60%	53	88	60%
NWS Earle	32	49	65%	30	49	61%
NWS Seal Beach	280	462	61%	260	462	56%
NWS Yorktown	10	23	43%	10	23	43%
NAVSEA NOC TOTAL	392	648	60%	362	648	56%

DEPOT	2004 WORKLOAD	2004 CAPACITY	2004 UTILIZATION	2005 WORKLOAD	2005 CAPACITY	2005 UTILIZATION
NSWC Crane	612	673	91%	635	724	88%
NSWC Louisville	1940	2333	83%	1963	2353	83%
NAVSEA NSWC TOTAL	2,552	3,006	85%	2,598	3,077	84%

**PUBLIC SECTOR CAPACITY UTILIZATION
(DLH's IN THOUSANDS)**

NAVY CONTINUED

DEPT	FY94 WORKLOAD	FY94 CAPACITY	FY94 UTILIZATION	FY95 WORKLOAD	FY95 CAPACITY	FY95 UTILIZATION
NUWC Keyport	1,861	2,339	80%	1,618	1,958	83%
NAVSEA NUWC TOTAL	1,861	2,339	80%	1,618	1,958	83%

DEPT	FY94 WORKLOAD	FY94 CAPACITY	FY94 UTILIZATION	FY95 WORKLOAD	FY95 CAPACITY	FY95 UTILIZATION
SPAWAR TOTAL	394	486	81%	402	496	81%

MARINE CORPS

DEPT	FY94 WORKLOAD	FY94 CAPACITY	FY94 UTILIZATION	FY95 WORKLOAD	FY95 CAPACITY	FY95 UTILIZATION
MCLB Albany	1,599	1,211	132%	1,470	1,215	121%
MCLB Barstow	1,397	1,178	119%	1,295	1,178	110%
MARINE CORPS TOTAL	2,996	2,389	125%	2,765	2,393	116%

**PUBLIC SECTOR CAPACITY UTILIZATION
(DLH's IN THOUSANDS)**

AIR FORCE

BUREAU	FY94 WORKLOAD	FY94 CAPACITY	FY94 UTILIZATION	FY97 WORKLOAD	FY97 CAPACITY	FY97 UTILIZATION
OC-ALC	7,667	9,003	85%	7,442	9,173	81%
OO-ALC	5,779	8,826	65%	4,950	7,567	65%
SA-ALC	7,936	9,057	88%	6,116	7,130	86%
SM-ALC	6,359	7,024	91%	5,247	7,024	75%
WR-ALC	8,564	8,187	105%	7,941	7,464	106%
AGMC	899	1,150	78%	0	0	0%
AMARC	(674)			(549)		
AIR FORCE TOTAL	37,204	43,247	86%	31,696	38,358	83%

Excludes AMARC Workload

DEFENSE LOGISTICS AGENCY (DLA)

BUREAU	FY94 WORKLOAD	FY94 CAPACITY	FY94 UTILIZATION	FY97 WORKLOAD	FY97 CAPACITY	FY97 UTILIZATION
DLA Mechanicsburg	120	160	75%	162	160	101%
DLA Stockton	50	84	60%	0	0	0%
DLA Memphis	10	0	0%	0	0	0%
DLA TOTAL	180	244	75%	162	160	101%

Industry Capacity Portrayal

Figure D-2 below provides a summary of the four commodity groupings of the industry capacity data and provides utilization for each weapon system category. As with the public sector data, a large quantity of excess capacity is reflected. A detailed portrayal for all the industry data is contained in Table D-2. Total average utilization reported by industry was 46 percent. By commodity group, the data ranged from 34 percent for ground systems and 39 percent for C-E/missiles to 44 percent for fixed wing and 63 percent for sea systems. The weapon system grouping with especially low utilization were, strategic missiles at 24 percent and combat vehicles/artillery at 25 percent.

INDUSTRY CAPACITY UTILIZATION BY WEAPON SYSTEM CATEGORY

Figure D-2

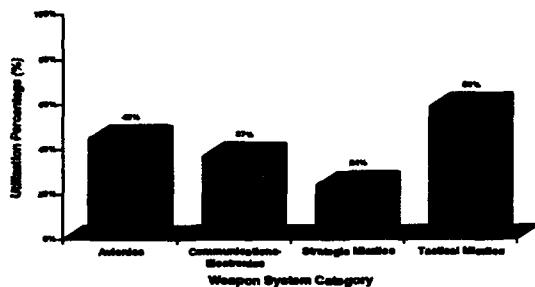
Industry Capacity Utilization By WSC And Weapon System Category

24-Mar-04

Electronics & Missiles

Weapon System Category	Total DLM Workload (hrs)	Actual DLM Capacity (hrs)	Utilization Percentage
Aerospace	20,770	20,770	100%
Communication Satellites	50,700	50,700	100%
Strategic Missiles	10,287	10,287	100%
Tactical Missiles	10,001	10,001	100%

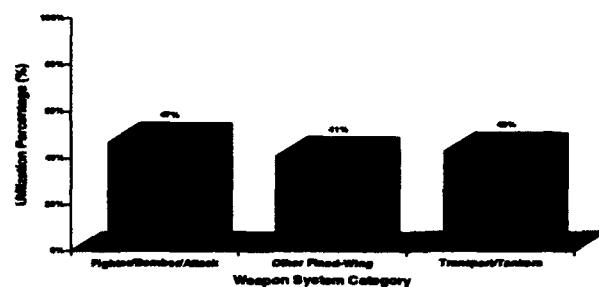
Industry Capacity Utilization By Weapon System Category



Planned-Wing

Weapon System Category	Total DLM Workload (hrs)	Actual DLM Capacity (hrs)	Utilization Percentage
Fighter/Attack	70,000	70,000	100%
Other Planned-Wing	50,771	50,771	100%
Transport/Tankers	50,000	50,000	100%

Industry Capacity Utilization By Weapon System Category



Industry Capacity Utilization By WSC And Weapon System Category

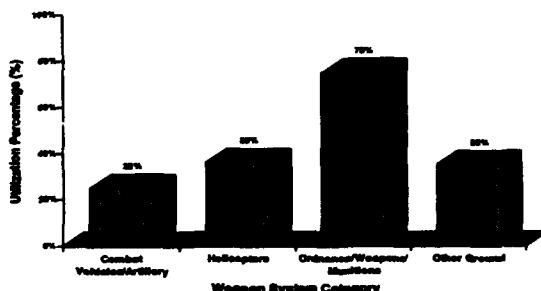
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Page 1

Ground

Weapon System Category	Total DLM Workload (hrs)	Actual DLM Capacity (hrs)	Utilization Percentage
Combat Vehicles/Artillery	6,031	6,031	100%
Helicopters	15,754	15,754	100%
Ordnance/Warfare/Munitions	1,000	1,000	100%
Other Ground	00	00	0%

Industry Capacity Utilization By Weapon System Category



Industry Capacity Utilization By WSC And Weapon System Category

24-Mar-04

Page 2

Sea Systems

Weapon System Category	Total DLM Workload (hrs)	Actual DLM Capacity (hrs)	Utilization Percentage
Aircraft Carriers	50,000	50,000	100%
Other Ships	50,771	50,771	100%

Industry Capacity Utilization By Weapon System Category



Industry Capacity Utilization By WSC And Weapon System Category

24-Mar-04

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INDUSTRY CAPACITY UTILIZATION
(DLH's IN THOUSANDS), AS OF JANUARY 1994

Table D-2

SECTOR	PRODUCTION WORKLOAD	DEPOT WORKLOAD	TOTAL WORKLOAD	RATED CAPACITY MINUS NOT USABLE FOR DEPOT	PERCENTAGE UTILIZATION
FIXED WING					
Fighter/bomber attack	73,399	5,967	79,366	170,415	47%
Transport Tankers	49,466	2,617	52,083	122,271	43%
All Other Fixed Wing	25,192	10,540	35,732	86,423	41%
FIXED-WING TOTAL	148,057	19,124	167,181	379,109	44%
GROUND					
Helicopters	11,759	3,975	15,734	43,480	36%
Combat Vehicles/Artillery	5,375	646	6,021	23,799	25%
Automotive/Construction					
Ordnance/Weapons/	1,247	373	1,620	2,160	75%
Munitions					
All Other Ground	48	11	59	170	35%
GROUND TOTAL	18,429	5,005	23,434	69,609	34%
ELECTRONICS/MISSILES					
Strategic Missiles	9,782	5,515	15,297	64,964	24%
Tactical Missiles	18,229	1,332	19,561	33,419	59%
Communication/Electronics	31,693	4,575	36,268	97,476	37%
Avionics	31,494	1,682	33,176	73,298	45%
ELECTRONICS/MISSILES TOTAL	91,198	13,104	104,302	269,157	39%
SEA SYSTEMS					
Aircraft Carriers	13,081	7,588	20,669	29,645	70%
Submarines	34,287	1,124	35,411	52,504	67%
All other Ships	54,236	23,735	77,971	130,538	60%
Components/Other					
SEA SYSTEMS TOTAL	101,604	32,447	134,051	212,687	63%
GRAND TOTAL	359,288	69,680	428,968	930,562	46%

OBSERVATIONS

In Figure D-3 below, a portrayal of industry capacity and utilization has been compared with 1993 public sector workloads from Task 1 in an effort to scope the industrial base issue. An appreciation of the relative magnitude of public sector peacetime workload compared to the industrial base production and capacity size can be determined. Even if it were possible to put every bit of public sector workload into the private sector (and it is certainly not possible for wide variety of reasons), there would still remain a very large amount of excess capacity in industry. And in most cases the 1993 public sector workload data overstates what the expected future year workload will be.

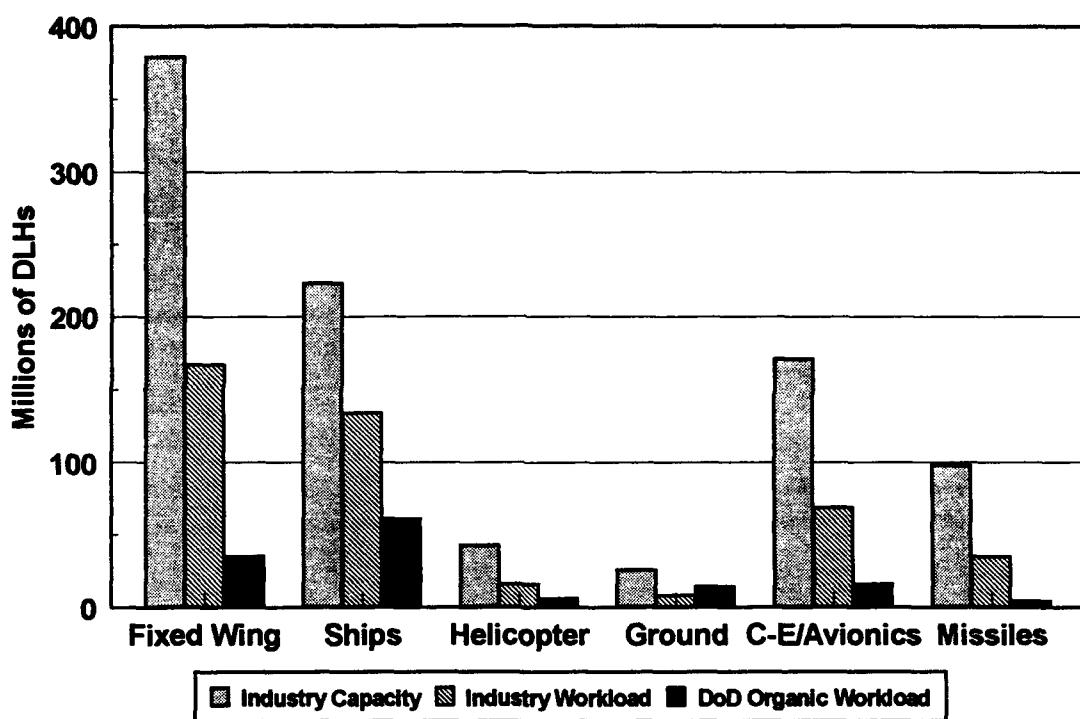


Figure D-3
DoD Organic Depot/Industry
Capacity and Workload Comparison

During deliberations of the Sea Systems commodity group of the Task Force, industry representatives expressed strong concern that capabilities from closing public sector facilities may enter the inventory in business areas where there is already a tremendous amount of excess capacity. Given that the Task Force agrees that maintenance of the industrial base must be a key focus of DoD policy, it is not in the interest of DoD to further weaken a troubled sector. The focus of the issue is that some of these capabilities may enter the market at less than full market value and afford the operator with an unfair advantage over current DoD contractors. It is DoD and Administration policy that facilities effected by the BRAC process be expeditiously converted to

minimize the adverse economic impact of down sizing. The legitimate interests of industry will need to be addressed in a manner that is consistent with current National policy.

CONCLUSIONS

There is not an agreed upon method of collecting capacity data between industry and the public sector. Current public sector capacity data does not satisfy industry requests to have visibility of actual capabilities to conduct specific workloads. Likewise, except in the most simplistic of terms, industry does not have a uniform method of capacity determination.

Significant excess capacity was identified in both the public and private sectors in the data provided to respond to this task. Approved Base Realignment and Closure (BRAC) decisions will remove some of the excess public sector capacity. The 1995 round of BRAC is also expected to remove significant additional public sector excess capacity. However, there are concerns that the process of divesting some public sector facilities may aggravate the amount of private sector capacity available and that these facilities may not enter the private sector inventory at full market value.

Past practices concerning facilitating public depots to acquire capacity for new weapon systems have not always adequately considered industrial base issues at major acquisition review milestones.

RECOMMENDATIONS

A common system for measuring capacity and capability - both public and private sector - should be developed. This will require both public and private sectors to revise current capacity and capability measurement methods to a uniform methodology.

Recognizing the need to reduce infrastructure in a sector with tremendous excess capacity, a policy is required which prevents closed depots and shipyards from being used in an unfair competitive manner to the detriment of the industrial base.

Policy associated with the acquisition of weapon systems should be modified to ensure that industrial base issues are considered prior to the generation of new DoD depot maintenance capability/capacity. This consideration should become an integral element of the life cycle evaluation in the Defense Acquisition Board (DAB) or Service Acquisition Review Council (SARC) processes.

METHODOLOGY FOR INDUSTRIAL CAPACITY DETERMINATION:

The methodology used by the Industry Depot Task Force derives "Current Capacity for Depot-Level Work" in equivalent DLH from "Rated Capacity," i.e., the maximum annual plant output a particular company could apply to a particular commodity group such as combat vehicles. The Current Capacity for Depot-Level work is determined by subtracting from Rate Capacity those workloads that are unavailable for depot-level work. Rated Capacity, in this model, is assumed to be a function of on-board direct labor head count as of January 1, 1994. On-board manning is converted to "Rated Capacity" by use of a "Utilization Factor" and the quotient multiplied by the annual number of hours of direct labor worker expends in productive labor to express the result in DLH. "Utilization Factor" is defined as:

$$\text{Utilization Factor} = \frac{\text{Total Work with current manning (January 1994)}}{\text{Total capacity as limited by facilities, vendors or other factors.}}$$

The annual number of hours an industrial direct labor worker expends in productive work was set at 1800 for this analysis. This assumes that 2080 work hours are available annually (52 weeks x 40 hours/week), 240 hours are allotted for holidays, vacation, sick leave and 40 hours set aside for training and equipment downtime. (It should be noted that this is different than the direct labor annual figures used by the government. Government calculations use 1615 for all except shipyards, which are calculated at 1537). The methodology for determining industrial Current Capacity for Depot-Level work is shown in the following figure.

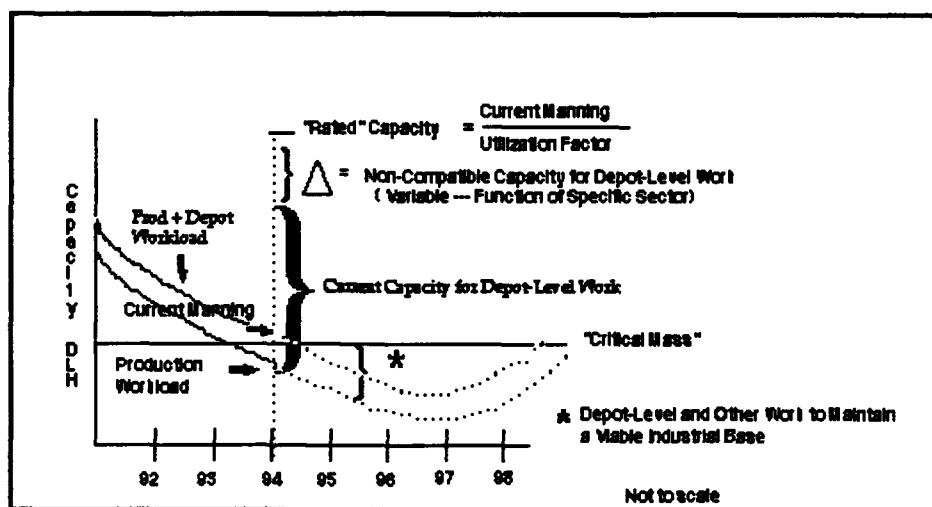


Figure D-a-1
Industry Capacity Methodology

Derivation of "Current Capacity For Depot-Level Work":

The Concept of "Critical Mass" is introduced to illustrate how depot-level work could be used to maintain the requisite workload to produce and support high-quality, affordable weapons systems as production workload is projected to decrease in the future.

For example, to determine Current Capacity (and Excess Capacity) for depot-level work by a particular industry in one of the commodity groups being considered: assume an on-board head count of 100 on January 1, 1994, a Production (and R&D) workload of 100K Direct Labor Hours (DLH), is "Utilization Factor" of 0.75 and that 10% of "Rated Capacity" is not compatible for depot-level work and is not in use for other work.

Then,

- 100 heads @ 1800 hrs./yrs. = 180 KDLH (Leaves 80 KDLH for depot-level work)
- 180 KDLH/.75 (Utilization Factor) = 240 KDLH (i.e., "Rated Capacity")
- Current Capacity (for depot-level work) is 116 KDLH or $(240 - .10(240) - 100)$
Rated Capacity - Non Compatible - Production
- Excess Capacity (for depot-level work) is 36K DLH or $(116 \text{ KDLH} - 80 \text{ KDLH})$ (*Current Capacity - Depot-level Work in progress*)

APPENDIX E

**IDENTIFICATION OF DEPOT WORKLOAD
ALLOCATION RATIONALE**

TASK 3: An identification of the rationale used by the Department of Defense to support a decision to provide for the performance of a depot-level maintenance workload by employees of the Department of Defense or by non-Federal Government personnel.

APRIL 1994

**DEFENSE SCIENCE BOARD
DEPOT MAINTENANCE MANAGEMENT TASK FORCE**

TASK 3: An identification of the rationale used by the Department of Defense to support a decision to provide for the performance of a depot-level maintenance workload by employees of the Department of Defense or by non-Federal Government personnel.

OVERVIEW

The rationale used by the Department of Defense to allocate depot maintenance workload between the public (employees of DoD) and private (non-Federal Government personnel) sectors is currently being revised to incorporate the new CORE concept. Historically, DoD had a predilection to establish and maintain a large organic infrastructure in order to support cold-war surge and mobilization requirements. However, the process for the allocation of depot maintenance workloads is being transformed to comply with OSD's CORE policy guidelines. OSD has delegated the source of repair (SOR) decision making responsibility — where specific workloads will be accomplished — to the Service (or DoD Agency) that is either acquiring the system/component (for new systems) or is the owner/user/weapon system manager (for existing systems). The Services are modifying their decision tree processes (used to arrive at SOR decisions) by reevaluating and reprioritizing the essential factors they have historically considered. Those primary factors are:

- ◆ Mission essentiality.
- ◆ Cost.
- ◆ Risk.
- ◆ Owning Service organic capability to perform the work.
- ◆ Other DoD organic capability to perform the work.
- ◆ Private sector capability to perform the work.

In modifying their decision tree processes to be consistent with the new CORE concept, the Services are calculating the minimum organic capability required to meet readiness and sustainability requirements of the weapon systems that support JCS contingency scenarios. As a result of DoD's (and the Services') requirements to maintain CORE capability, other key variables now have to be considered in the SOR decision process. Those factors include:

- ◆ Identification of the depot maintenance workload requirements for essential weapon systems supporting JCS contingency scenarios.
- ◆ Development of CORE capabilities required in the public depots to be able to respond to these surge requirements.
- ◆ After the Services calculate their CORE capability requirements, what actual

workload must be accomplished organically to maintain those capabilities?

- ♦ Where will the workload not required to establish and/or maintain CORE capabilities --"non-CORE workload" -- be performed? Existing DoD direction, including recent Congressional testimony by Secretary Perry, calls for non-CORE workload to be competed in both the public and private sectors. However, with the exception of the Air Force, the Task Force's recommendation is that non-CORE workload be competed in the private sector without competition with public depots.
- ♦ Congressional legislation that restricts decision implementation of specific allocation actions e.g., the "60/40" requirement and limits placed on Army aviation workload.

Given the current dynamic nature of the source of repair decision process, this appendix will:

- ♦ Highlight the historical underpinnings of the decision rationale used by the Services to determine their depot maintenance sources of repair.
- ♦ Detail the current decision tree processes.
- ♦ Discuss factors that must be addressed in future decision tree processes.
- ♦ List legislative considerations that influence the processes.

DISCUSSION

HISTORICAL OVERVIEW

Prior to the formulation of the new CORE concept, the Services' decision tree processes had, as a fundamental basis, the need for ready, organic surge capacity to meet the immediate needs of operational forces while buying time for the private sector production base to gear up for wartime demands. The large-scale, full-mobilization scenario drove the logic of the processes, resulting in the establishment and maintenance of substantial organic depot maintenance capacity and capability. This policy, routinely implemented by the Services using their SOR decision processes during the early stages of system development, was based on a number of factors including: existing organic capability; desirability of increasing organic depot technology in support of critical weapon systems and workloads; cost of setting up maintenance; system density, location, and planned use; and design stability. In addition, depot maintenance managers adjusted workloading of public and private sector sources based on cost and workload balancing. Linkage to specific warfighting capabilities derived from JCS scenarios was generally not accomplished.

Once the decision process resolved whether public or private sector support was required, the Services used a jointly-developed depot maintenance interservicing (DMI) program to further refine the decision. If the Service decision process indicated that private sector support was appropriate, the DMI program validated that contract support was warranted and that support for the item did not already exist in another Service. When the Service decision process indicated that organic support was required, the DMI program identified which Service could provide the most cost-effective capability. The goal of the DMI program was (and continues to be) to avoid unwarranted duplication of depot maintenance capacity and capability.

CURRENT DECISION TREE PROCESSES

This discussion outlines specific Service/Navy SYSCOM¹ documentation of their existing decision processes or decision tree analyses (DTA) conducted in accordance with OSD direction. While some Services/Navy SYSCOMS appear to be farther along than others in revising their processes to incorporate the new CORE concept, all are aware of the requirements and are making progress in its implementation.

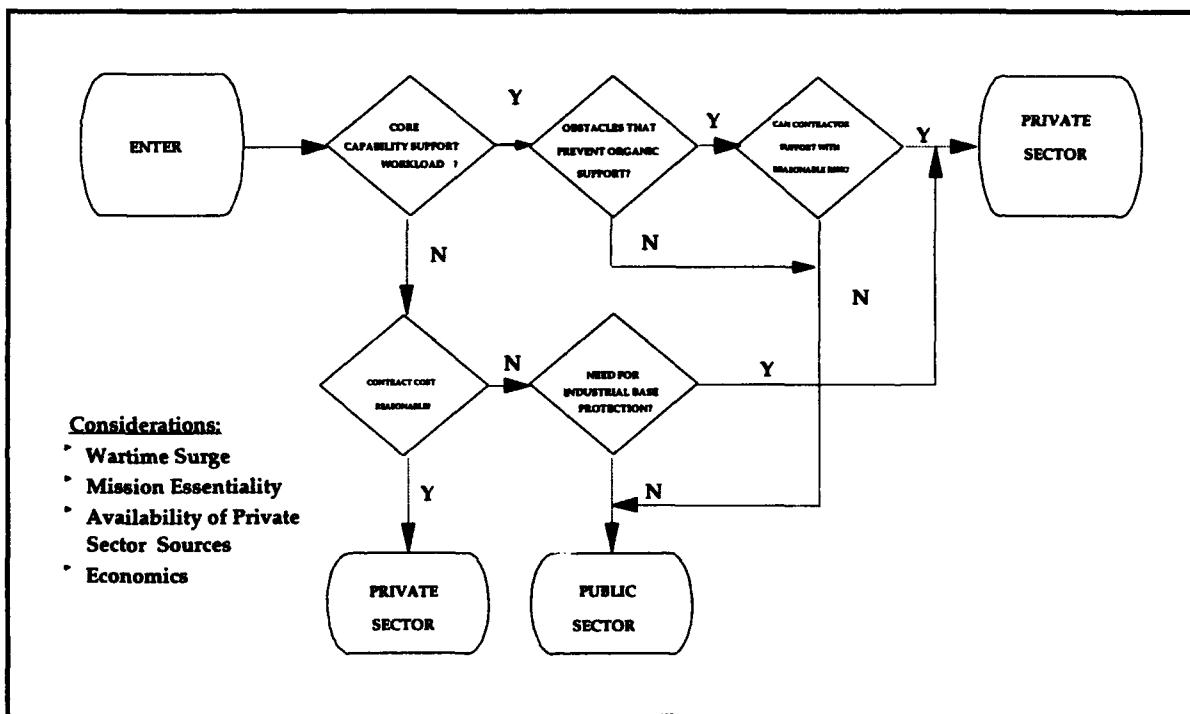


Figure E-1
Generic Decision Tree Process

¹ There are three Navy System Commands' (SYSCOMS) processes outlined in the discussion that follows.

The decision tree process is a disciplined, logical decision support analysis approach. Figure E-1 depicts a simple, illustrative decision tree process for depot maintenance. The Services have identified a substantial number of decision factors that act as decision points in their processes. The decision tree process supports decision makers in ensuring that a standard set of criteria, visible to all, are considered. It adds discipline to decision making that might otherwise be done in an ad hoc manner. Details of the Services/Navy SYSCOMs processes follows.

Army: In implementing DoD guidance, the Army first determines the appropriate level for repair and recovery of both end items and components. The determination is accomplished as an essential element of the Army's Logistic Support Analysis (LSA) which includes a Level of Repair Analysis (LORA). The LORA considers the requirement for additional tools, support equipment, maintenance skills, and repair parts for each potential site. Overall life cycle costs are then compared for each of the options in order to recommend the most cost effective maintenance plan. Once the depot maintenance tasks have been identified, the SOR is determined through the use of a decision tree logic process by the program executive office/program manager (PEO/PM) and the Army Materiel Command Major Subordinate Command (MSC). The specific process is as follows:

- (1) The DTA first identifies workload that may be considered for a set aside program e.g., workload involving proprietary rights to the technical data.
- (2) The essentiality of the materiel is then considered using the items contained in the Army's Industrial Preparedness List. If the materiel is considered essential to meet contingency requirements, it will tentatively be assigned to the organic base. If the materiel is not needed to meet contingency requirements, it will be considered for interservicing, organic or contract. The relative life cycle costs of each of these options are considered before a SOR would be selected.
- (3) The total capacity and capability of the organic base is then identified. If the capacity/capability exists and if the workload is considered essential, the proposed workload is programmed for organic. If the capacity and/or capability does not exist and the workload is mission essential, the Army solicits interim contractor support (ICS) and then programs to establish future organic capability and capacity. This organic requirement is revised as mobilization plans are revised. In addition, as new equipment with new technology is introduced, the depot capability and capacity objectives are revised to meet the minimum baseline level for those systems that are critical to the Army's readiness.
- (4) Given there is essential materiel that requires depot maintenance and the capacity exists to do the work in the organic depot system, the decision logic would make a final check to address any additional obstacles to organic support.

Examples of such obstacles would include the need for specialized test equipment, maintenance skills, technical data, proprietary rights or even prohibitive costs. Interim or permanent contractor support may be considered when organic constraints preclude organic assignment.

(5) Given no obstacles, the workload is assigned to the appropriate Army depot. After the depot system peacetime capacity is workloaded to meet mobilization requirements, the remaining peacetime workload is then considered for either contractor or interservice.

(6) When items are selected for organic repair, they also qualify for depot maintenance interservice (DMI) review by the Joint Depot Maintenance Analysis Group (JDMAG). DMI is considered before contract to test for available, excess DoD capacity before considering contracting out the workload. This process also avoids unwarranted duplication of depot maintenance capacity and capability in DoD.

(7) When the contract option is considered, all available contract sources are compared on the basis of cost, risk, capability, and other appropriate factors as specified by current Defense Acquisition Regulations.

(8) Finally, Army Materiel Command (AMC) reviews, considers, and approves SOR decisions and ensures that SOR decision tree logic was considered. Additionally, AMC ensures SOR decisions are documented and action taken to update mobilization plans.

In implementing the above process for major weapon systems managed by the PEO's, the acquisition strategy may include the use of contractor maintenance. If this decision is in conflict with the DTA, resolution would be reached at the Army Acquisition Review Council (ASARC). The Army goal is to provide organic support for all newly introduced mission essential items and systems. The decision to use contractor support is based on analyses that demonstrate that contractor support: (1) is the optimum among feasible alternatives; (2) will provide the required support in peacetime and wartime scenarios; (3) is the most cost effective method; and (4) is clearly in the Government's best interest. The materiel developer prepares, coordinates, and approves the Depot Maintenance Support Plan (DMSP) in the Engineering and Manufacturing Development phase, or prior to the Milestone III decision. Additionally, the Army takes into account the Congressional direction regarding the balance of work between the public and private sectors, i.e., the "60/40" legislation. Also, the Secretary of the Army is required to have at least 55% of his aviation depot maintenance workload accomplished organically during FY94 and a minimum of 60% accomplished organically during FY95.

Navy: The Secretary of the Navy has established a generalized DTA process containing inherent flexibility for the Naval Aviation Systems Command (NAVAIR), the Naval Sea Systems Command (NAVSEA), and the Space and Naval Warfare Systems Command (SPAWAR) to meet their unique requirements. The Department of the Navy's generalized process consists of statutory responsibilities (i.e., Title 10 of the U.S. Code), mission imperatives (technical accountability, infrastructure and expertise, and acquisition decisions) and policy imperatives (maintenance of adequate organic capability to: translate military requirements into concepts and technical specifications; respond to changes in the threat; support Fleet maintenance through the intermediate level; be a smart buyer; certify weapon systems prior to their use by the fleet; and conduct highly classified work to meet the changing threats in the undersea, space, surface and shore environments). Specific processes for Navy SYSCOMS are:

NAVAIR's decision process is designed to achieve the highest possible operational readiness at an affordable cost. Initial level of repair decisions are made in accordance with DoD's LSA and LORA procedures. The LORA is an economic model which helps logistics managers assign aircraft repairables to either the Organizational, Intermediate or Depot level based on overall projected life-cycle support costs. LSA/LORA results are published in Weapon System Maintenance Plans.

New weapon systems and weapon system repairables coded "D-level" are evaluated using the DoD CORE methodology to determine whether a new or expanded maintenance capability is required.

- ◆ If the weapon system is planned to be used in one or more current JCS contingency scenarios and it is discovered that a capability to support the weapon system is already in place in any DoD depot or shipyard by virtue of existing CORE, then the depot workload associated with the new weapon is assigned to the current capable depot (using interservice procedures if the depot is in other Service).
 - Workload quantity in excess of that required to preserve CORE capabilities will be made available to private industry.
- ◆ If the weapon system is planned to be used in one or more current JCS contingency scenarios and there is not currently weapon system support capability within the Department of Defense for the new item, a risk assessment is undertaken to determine the feasibility of potential commercial sources of depot support (either interim support or life-of-type). Strong candidates for private sector support include commercial off-the-shelf hardware items and military derivatives of commercial products (e.g., some aircraft engines).
- ◆ If the weapon system is planned to be used in one or more current JCS contingency scenarios and no low risk alternative exists, NAVAIR will assign a

Naval Aviation Depot to establish new CORE capability in order to provide a ready and controlled source of depot support. In many cases, this new system is being introduced into the Navy inventory to replace an obsolete weapon. In such cases, the new capability can be phased in while one or more mature capabilities are either consolidated or phased out.

Depot maintenance workload in support of Navy systems and equipment not required by current JCS combat contingency scenarios is also directed to private industry (e.g., training aircraft).

At times, the Naval Aviation Depots will be unable to find an economical commercial source of repair for old (and sometimes even obsolete) weapon systems. In these cases, it falls to the Naval Aviation Depots to act as "last sources of repair." This work is almost never in support of CORE, but remains in the organic base until the equipment is retired.

NAVSEA has somewhat limited flexibility in its SOR decision process because of its significant infrastructure and labor force requirements. In general, the decision process has evolved into most nuclear and large deck surface ships being overhauled at public shipyards while surface combatant, amphibious, and auxiliary vessels are assigned to private shipyards. It should be noted that even in the last category of vessels, some surface combatant ships are selectively assigned to public sector yards to fill workload gaps. The ship assignment methodology is essentially as follows:

- ◆ Nuclear ship availabilities are primarily, with some exceptions, assigned to the public sector based on naval shipyard capability and capacity.
- ◆ Large deck and complex surface ship (CV, LHA, LHD, AFG, LCC) availabilities are normally assigned to public yards due to complexity of work and requirement for large drydock.
- ◆ Surface combatant, amphibious and auxiliary vessel availabilities are primarily assigned to the private sector, except for those selected for public/private competition. Within this category, further analyses consists of:
 - Some surface combatant availabilities are selectively assigned to public sector to fill workload gaps, and/or to keep the ship in homeport.
 - East coast submarine SRAs, with the exception of those homeported in Charleston, are competed public/private.
 - Public/private "60/40" split is reviewed annually after Fleet Scheduling Conferences for compliance, and availability assignments adjusted if necessary.

- Public/private competition program is reviewed and availabilities added or deleted to meet prescribed goals.

Appropriate directives call for the assignment of workloads (private or public depots) to be made in a manner that ensures adequate readiness, combat sustainability of operational forces, efficient use of available resources, and maximum economies in maintenance operations. For NAVSEA, the critical factors that are used in the assignment of ship overhaul work to a specific shipyard are:

- ◆ Homeport
- ◆ Shipyard capability/type ship
- ◆ Drydock availability
- ◆ Cost

In the general assignment of nuclear and large deck surface ships to public shipyards, considerations in addition to those listed above include:

- ◆ Shipyard workload
- ◆ Work continuity
- ◆ Availability of fleet drydocks
- ◆ Operation cycle
- ◆ Estimated fuel depletion (nuclear ships)
- ◆ Fleet preference
- ◆ Special considerations including ocean engineering and treaty considerations for SSBN inactivations

Criteria for private assignment include the 60/40 split and anticipated duration (less than six months - stay in port, six months or greater - coastwide bid). With respect to planned public/private competition, DMRD 908 establishes the goals: (1) to compete 20% of the total workload by FY97; (2) compete surface combatant overhauls; (3) compete submarine SRA's east coast (west coast SRA's will be competed starting in FY96); and (4) public yard in homeport area.

SPAWAR's decision tree analysis is conducted for each new design equipment during the developmental phase and during acquisition planning for Non Developmental Items (NDI) and commercial-off-the-shelf (COTS) items. The DTA is used to determine if depot level support should be provided by a public or private source. The primary influence on this process is the need for a public capability to support the mission and policy imperatives discussed above (in the general Navy section). The DTA outcome will determine the introducing (requiring) Services' candidate depot SOR (private or organic) for the DMI study.

The initial step in the DTA process is designed to determine if the proposed workload is CORE capability support. This begins with an analysis of the criticality of specific work and considers the need for an inherent organic operation based upon

mission and policy imperatives. Included in the DTA is a process known as "posture planning" which is used to analyze critical workloads for potential organic or commercial assignment. This process involves numerous steps designed to assess the state of SPAWAR's organic depot repair technology and determine if augmentation is required to ensure continued currency of the depot capability.

Part of the posturing process is used to verify that sufficient infrastructure and technical expertise exists to ensure that the DON retains the ability to be a smart buyer (i.e., to support the life cycle of new systems) which includes assuring systems are safe and effective prior to Fleet introduction. On occasion, the well being and retention of qualified military personnel must also be considered. In certain specialized ratings, e.g., cryptological equipment repair, there are insufficient shore duty assignments available to allow for rotation between shore and sea duty, thus a repair capability is established to provide training and shore duty rotation.

If, as part of the DTA, a workload is determined as not required to support CORE capabilities, a life cycle cost (LCC) analysis is performed to determine the most cost effective mechanism for assignment of the workload either to the public sector via inter/intraservicing, or contracting it out to the private sector. If the cost is considered unreasonable, another analysis is performed to determine if the workload is needed to preserve the industrial base. If the workload is essential to maintain the industrial base, a contract is awarded to the private sector if sufficient funds are available. This analysis consists of steps designed to determine if an adequate technical data package is available, the cost to procure data, and, if private, the number of sources available for competition, the cost of running the competition, etc. If the cost is determined to be reasonable, efforts are initiated to award a contract to the private sector.

The DTA process structures the basic decision process to determine if an item will be retained as part of the organic capacity or contracted out. Thus once the basic decision has been made, the remainder of the process details the steps required to execute the decision. This includes the DMI study analysis, which is a more formal follow-on effort performed by the JDMAG. It is designed to validate the individual Service DTAs and mediate situations where two Services have targeted the same workload as critical.

Workloads postured for the private or public sector must still be identified to the JDMAG and competed for via the DMI process. As stated, the DMI study process provides for the assignment of depot responsibility, both public and private, under Service coordination and control.

Each DMI study submitted to the JDMAG for a decision represents the results of the internal DTA assessment. The numerous steps that it entails are designed to assess the state of SPAWAR's depot repair technology and determine if augmentation is required to assure continued currency of the depot capability. As stated, the purpose of the process is to ensure the existence of sufficient infrastructure and technical expertise

to maintain SPAWAR's basic ability to be a smart buyer and to support life cycle of new systems. This assures that systems are safe and effective before Fleet introduction.

Air Force: The Air Force's decision tree process is currently composed of three major phases: (1) identification; (2) evaluation; and (3) approval. The identification phase is the process of determining which workloads must be processed through the DTA cycle. These workloads include: new starts, modification programs which will generate new repair requirements, and workload shifts. Workload shifts can be an organic to contract, or organic to organic SOR move. However, the transfer from contract to organic is considered a new start rather than a workload shift. Before DTA evaluation between a contract and an organic SOR can be accomplished, the Air Force candidate depot must be selected. This is done using the SOR Decision Criteria (SORDC). The SORDC uses the information requested for the DTA analysis and appraises the current posture of each center against the requirements spelled out in the DTA data. Once a DTA requirement has been identified, the evaluation phase begins using the following data:

- ◆ Present SOR. This describes where the workload is currently being repaired. It can be at an Air force depot, contract (ICS,CLS) or interservicing. In most cases, it will be a new start or modification for which there is no existing SOR.
- ◆ Description of system/program. This will explain the purpose, function and unique characteristics, i.e., the technological aspects.
- ◆ Description of workload. This describes the type of depot repair that is anticipated to be accomplished. Included is the Repair Group Category (RGC) and technology.
- ◆ Projected surge rate.
- ◆ Logistics Support Priority.
- ◆ Supporting information for the DTA logic. The rationale for each yes/no response for the DTA logic.
- ◆ Recommended SOR with narrative justification. This will explain the reason for the designated SOR. Considerations include posturing goals, surge cost, technology, weapon system integration, etc.
- ◆ Estimated costs. This includes costs for facilities (addition/alteration), support equipment, training, technical data, and software development. Costs provided will include the total investment cost and differential cost (difference between organic and contract options).

- ◆ Workload. A five year projection to include the initial and peak years.

The DTA approval process consists of a detailed review by a board of key business managers from the various product and support centers, including the headquarters. If required, the DTA will be reviewed by the Support and Industrial Operations Board, a board of general officers/senior civilians. Final signature authority is held by AFMC Director for Logistics or the AFMC Commander depending on the size of the workload.

The Air Force's DTA process is a formalized process for selecting an organic or contract SOR and is integrated with the AFMC business planning process, especially regarding evaluation and approval. Since the process is systematic as it applies to all workloads, it provides an audit trail for all levels of management. And lastly, with emphasis on early SOR assignments, the DTA process compliments the early depot activation concept which ensures early identification of depot maintenance resource requirements in the most economical manner.

Marine Corps: While understanding the general instructions established by the Secretary of the Navy, the Marine Corps maintenance planners follow policies which call for maintenance to be performed as far forward as possible. When a requirement for depot maintenance is identified, contractual SORs are only considered when there is no possibility of organic depot repair. In addition, private sector depot repair is sometimes dictated by technology, i.e., the technology for guidance systems such as the fire and forget anti-armor is owned by a specific contractor. Much of the technology is moving forward at such a fast pace that organic support would be obsolete before it could be activated.

Defense Logistics Agency: For cost efficiency and effectiveness reasons, DLA has historically loaded organic depot sites to capacity prior to competing workload on a private-private basis. The workload, exclusively industrial plant equipment maintenance for the military services, was thus allocated without the need of a formal decision tree process.

Future Decision Processes—CORE and Competition:

The section above described the Services/Navy SYSCOMs current decision tree processes which, in varying degrees, address the CORE concept. A detailed description of CORE is contained in the reply to Task 5 (Appendix G) and therefore will not be given here. However, it is important to understand the basics of the CORE concept and its impact on the SOR decision process.

DoD Directive 4151.18, *Maintenance of Military Materiel*, provides broad direction to DoD Components regarding depot maintenance source of repair decisions. Specifically, those decisions are required to be made by ". . . the acquiring DoD

Component logistics head using the depot source of repair assignment decision logic process" within 90 days of the engineering and manufacturing development contract award. The new CORE concept centers on a surge and combat support-based decision methodology that is applied and used by the DoD components as the basis for determining the minimum resources (facilities, plant equipment, and skilled labor) required in support of the mobilization scenario, and the organic capabilities and physical capacities to be established and retained as a CORE organic peacetime base for the Services/DoD Agencies. In addition, the existing DoD policy outlines three factors that are required to be considered in the SOR decision process:

- (1) Maintenance of equipment and materiel must be performed at the lowest level of maintenance that ensures optimum readiness and economic use of resources.
- (2) Competition between and among depot level maintenance activities of DoD and private entities shall be used as a means to achieve economies and efficiencies in maintenance of military materiel.
- (3) An integral part of a depot maintenance skill and resource base shall be maintained within depot activities to meet military contingency requirements. A CORE maintenance capability should comprise only a minimum level of mission-essential capability and must be under the control of an assigned individual or jointly determined DoD Component.

The calculation of CORE capability does not, in and of itself, result in clear-cut SOR allocation decisions. CORE is *not a workload—it is a capability*. The Services therefore retain the flexibility to select actual peacetime workload for assignment to the private sector while also retaining the ability to allocate to organic depots the workload necessary to maintain required CORE capabilities.

The Depot Maintenance Task Force, while recognizing the benefits generally resulting from the competition process (e.g., production process improvements and cost reductions), also recognizes the importance of the private sector industrial base in the support of national security requirements, particularly in the long run. In addition, the public-private competition process itself is time consuming, costly, and the goal of a "level playing field" may never be achieved. Task Force Industry and Service representatives (with the exception of the Air Force) believe that public-private and public-public competition is not cost effective, and should be eliminated. Regardless of what the ultimate DoD policy on competing non-CORE workload will be, its impact on the SOR decision process will be significant.

The current public/private competition program impacts logical implementation of Service decision tree processes. Basically, logical analyses of where a workload should be performed is subordinated to the competitive process. The competition

program complicates accurate projection of workloading and planning of capacity utilization.

Legislative Considerations Impacting Decision Tree Processes:

Some of the Congressional legislation that has impacted or could impact DoD depot allocation decisions include:

- ◆ The SECDEF may not contract for the performance by non-Federal Government personnel of more than 40% of depot maintenance workload.
- ◆ The percentage limitations on Army aviation depot maintenance accomplished organically (described earlier).
- ◆ Performance of the depot maintenance workload with a threshold of \$3M that is currently being performed by a DoD depot activity cannot be changed from a public sector source to a private sector source unless the Service uses competitive procedures.
- ◆ No activity/function performed by 10 or more employees can be converted to contract until a most efficient and cost effective organizational analysis is provided to the HAC and SAC.
- ◆ Directed implementation of the 1993 BRAC recommendation concerning the consolidation of tactical missile maintenance at Letterkenny Army depot (1994 DoD Appropriations Act).

CONCLUSIONS

- ◆ The Services have taken a number of approaches and consider a variety of differing factors in implementing OSD guidance on the decision tree process.
- ◆ There are varying degrees of compliance with the current OSD policy on the decision tree process which focuses on the CORE concept. It needs to be emphasized that most of the Services are transitioning from decision tree processes that historically attempted to maintain organic depot (public sector) capabilities to processes that attempt to maintain the minimum amount of CORE capability in the public sector with maximum private sector support for the remainder.
- ◆ There are a number of factors external to the decision tree process that can influence actual public versus private sector source decisions. For example, legislative guidance must be included as a factor in the decision process and, in

some instances, has limited the amount of depot maintenance available to be accomplished by the private sector.

- ◆ DoD policy requiring that the Services establish a decision tree analysis process to make organic/contract decisions satisfies a valid need. However, the existing Service processes require update and revision.

RECOMMENDATIONS

- ◆ The Defense Depot Maintenance Council direct the Military Services to review and revise Service procedures for the decision tree process to:
 - Ensure full implementation of current OSD policy and guidance on the CORE concept.
 - Ensure consistent application among the Services, but allowing for unique commodity characteristics.
 - Properly address the criticality of the industrial base.
- ◆ DoD implement the Task Force recommendation pertaining to the elimination of public-public and public-private competition.
- ◆ DoD seek to replace existing legislative restrictions with CORE policy.

References:

1. DoDD 4151.18, Maintenance of Military Materiel.
2. DoDD 5000.2, Defense Acquisition Management Policies and Procedures.
3. Army Regulation(AR) 70-1, Systems Acquisition Policy and Procedures.
4. AR 700-90, Industrial Preparedness List.
5. AR 700-127, Integrated Logistic Support.
6. AR 750-1, Army Materiel Maintenance Policies.
7. AR 750-2, Army Materiel Maintenance Wholesale Operations.
8. Secretary of the Navy Instruction 4860.42C, Use of Contractor and DoD Resources for Maintenance of Materiel.
9. OPNAVNOTE 4700 and OPNAVNOTE 4700.7F.
10. OPNAVINST 4790.14/AMC-R 750-10/AFMCR 800-30/MCO P4790.10A, Logistics Depot Maintenance Interservicing Program.
11. OPNAVINST 4790.14A.
12. AFR 66-7, Depot Maintenance Posture Planning and Workload Management.
13. AFMCR 66-48, Depot Maintenance Workload Management.
14. AFI 21-102 (draft), Depot Maintenance Management (will replace AFR 66-7).

15. AFMCI 21-XX (draft), Depot Maintenance Business Planning (will replace AFMCR 66-48).
16. Marine Corps Order 5000.10C, Systems Acquisition Management Manual.
17. Marine Corps Order P4105.3, Integrated Logistics Support Manual.
18. Integrated Management of Department of Defense Depot Maintenance Activities, October, 1993.

APPENDIX F

COST, MANNER AND QUALITY

TASK 4: An evaluation of the cost, manner and quality of performance of the depot-level maintenance workload by employees of the Department of Defense or by non-Federal Government personnel.

APRIL 1994

DEFENSE SCIENCE BOARD
DEPOT MAINTENANCE MANAGEMENT TASK FORCE

TASK 4: An evaluation of the cost, manner, and quality of performance of the depot-level maintenance workload by employees of the Department of Defense and by non-Federal Government personnel.

METHODOLOGY

In responding to the direction of the Congress for an evaluation of this fourth assessment area, the Task Force Working Group, with the assistance of the Industry Support Group, established a methodology to: (1) collect pertinent data and information, (2) to identify the opinions and policy positions of all interested parties, and (3) to provide the basis for a comprehensive analysis and evaluation. The methodology and data sources included:

- Direct data calls. This included requesting both the private sector and Military Services to provide selected data and information from official records and budgets. Because of the difficulty in obtaining information from the private sector, a representative sample of three major private firms was used for selected data elements and information on accounting practices and procedures. In addition, the fullest range of data was requested and obtained from the Military Services on costs, funding, accounting practices, quality programs, rates and prices, and other information pertinent to depot maintenance cost, manner, and quality performance.
- Qualitative or subjective input. The private sector and the Military Services each provided position papers on issues, and explanations of their policies and procedures.
- Use of existing data and reports. Existing industry studies, Service studies, GAO audits, DoD studies, and other sources of information and data on depot cost, manner, and quality programs were reviewed.
- Analysis of Contracts Awarded in FY 1992 and FY 1993. The Task Force assessed actual contracts awarded by the Services in FY 1992 and FY 1993. The assessment by the Task Force Working Group included two phases. First, a review of pre-award processes and bidder proposals. Second, an assessment of actual contract costs and schedule performance for contracts where base periods have been completed.

In reviewing bidder proposals, twenty-eight of the highest value contracts, competed on a public - private basis, awarded during fiscal years 1992 and 1993 were reviewed by a special data analysis support team. This team, made up of personnel on loan to the Task Force Support Group from the Defense Contract Audit Agency, the Defense Contract Management Command, and the Office of the Department of Defense Inspector General, reviewed over one hundred and five bids submitted from both

public depots and private companies during these competitions. The contracts reviewed ranged from \$2.2 million to \$62 million for the base workload (excluding options), and included an equal number of contracts won by private bidders and public bidders. The work performed under the contracts included ship overhauls (both surface ships and submarines), fixed wing aircraft contracts, aircraft engine contracts, electronic component contracts, and ground vehicle system contracts.

INTRODUCTION

Readiness And Cost

The Task Force was unanimous in the belief that DoD must divest itself of the current excess organic depot maintenance capacity in order to free up these funds to support vital force readiness requirements. This position is based on a number of factors including:

- Average savings from Naval Aviation Depots programmed for base closure is over \$70 million annually. For larger depots such as shipyards, savings could be as high as \$100 million annually.
- Recent studies conducted by the Office of the Secretary of Defense and the Joint Chiefs of Staff concluded that the DoD organic depots currently have 25 percent excess capacity and for some commodities the excess may be as high as 50 percent. After the closure or realignment of the organic depots that have already been approved for closure by the Congress is complete, there will still be a large excess capacity.
- Current Defense Guidance which recognizes the need to divest excess DoD capacity and unneeded facilities. In this guidance the Secretary of Defense has directed all the Services to down size commensurate with programmed force structure reductions.
- The Task Force reviewed depot maintenance contract bids by both the public and private sectors and found that the greater the amount of overhead expenses the depot or contractor carries, primarily from large facilities and engineering support staffs, the less competitive the bidder is when cost is the primary factor.
- The members of the Task Force from the private sector further reinforced this finding by stressing that private industry experience in recent years demonstrates that to remain competitive and to control cost companies had to "right size" their facilities and work force. The Task Force fully concurs with this assessment and finds that DoD must also right size the organic depot system in order to achieve the goal of providing the most cost effective support to the fighting forces.

The primary consideration upon which public-private workload issues should be judged is their impact on the readiness of the Armed Forces. Although the Task Force is unanimous in stressing the importance of readiness, the specific components of readiness and the interrelationships of readiness factors generates the widest range of opinions within the Task Force.

Further, the majority of the Task Force members place great emphasis on the inherent value that a robust and healthy defense industrial base provides for the overall readiness of U.S. Armed Forces. This view recognizes the natural tradeoffs that occur between funding for new procurement of weapon systems and the expense of maintaining existing weapon systems within an organic depot structure burdened by excess capacity. It also recognizes the necessity of ensuring that the private sector can maintain the vital systems engineering design, test, and system integration capabilities that are necessary for future weapon systems. Should this ability be lost in the short run, its reconstitution in the future would be cost prohibitive to the Defense budget.

The majority of research, development, and new production work that supports the private sector industrial base is already the domain of private industry. New manufacture and repair/overhaul are, in fact, fundamentally different and dollars available for repair will actually not be a major factor in preserving the vital private sector design and engineering capabilities. However, the Task Force believes that providing modification and upgrade work, and non-CORE maintenance work to the private sector can be an effective element in a broader defense industrial base policy. This is especially true in the case of shipyards where, due to the decline of new ship construction, this maintenance work will be a vital support element for the entire U.S. shipbuilding base.

The constrained budgets of this post-Cold War period has led to large backlogs of unfunded maintenance requirements which directly impact on readiness. This has led all the Services to place a high value on the role of cost. The Task Force also believes that private firms, using competition, can provide support comparable to that of public depots if the true costs of these activities are understood. Unfortunately, the current procedures and accounting systems of the public depots preclude an accurate assessment, leaving much uncertainty in making comparisons between public and private costs. This assessment appears to have almost universal agreement and is documented in numerous GAO and internal studies and contained in public statements by knowledgeable senior officials.

It is clear that both the government and industry members of the Task Force agree that the importance of obtaining depot maintenance services at the "best value" to the taxpayer is second only to maintaining readiness and sustainability. The method of obtaining the "best value" is really the only issue. The Task Force believes that reducing the infrastructure to support the CORE requirements (supporting 40-50% of the total depot maintenance activity) and putting the rest of the work out for industry

competition is, in both the near and long term, the best approach and should be the policy of the DoD. The Army and Navy have fully embraced this approach and have been moving rapidly to minimize their infrastructure.

GENERAL FINDINGS

- The Task Force is unanimous in recommending that readiness must be the fundamental yardstick used to measure depot maintenance issues.
- That cost plays a fundamental role in the decision making process but that in some instances the concept of cost must be expanded to include the overall "best value" to the nation. Further, that inherent in the process of defining best value is the need to assess the impact of cost decisions on the overall health of the U.S. industrial base.
- As a matter of policy, the Task Force recommends that major weapon systems modifications and upgrades that substantially alter or enhance weapon systems performance, should normally be done in the private sector in order to enhance the preservation of vital systems engineering design, test, and system integration capabilities that are necessary for future weapon systems. The exception to this policy should be in those instances where it can be demonstrated that is significantly more cost effective to perform the modification concurrent with planned repair or maintenance actions.

Additional Task Force findings and recommendations are included in the subsequent sections.

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COST OF PERFORMANCE

The Task Force assessment of the cost of performance of depot level work by government personnel and private sector personnel encompassed the identification of:

- The total cost of depot maintenance and how the funding is currently allocated between the public and private sector.
- The elements of cost included in each sector, and what costs are unique to one sector or the other.
- The factors that result in one sector or the other paying more, the same, or less for any standard element of cost.
- Cost factors to the Department of Defense that differ by sector.
- The costing issues that are viewed as preventing a "level playing field" in the public-private workload competitions.
- Variances in costing that are unique to each of the focus areas (Aircraft, Shipyards, Ground Equipment, Missiles & Electronics).
- Other "best value" considerations in the depot maintenance arena that should be assessed.
- What it costs to compete. Determine what costs are entailed in preparing bids, estimating costs for competitions, and other related costs of competitions.

DEFINITIONS

1. **COST** - A monetary measure of the amount of resources applied to a cost objective. Within the Department of Defense (DoD) costs are identified following General Accounting Office accounting principles and standards as implemented by DoD Financial Management Regulation, DoD 7000.14-R, Volume 1, General Financial Management Information, Systems, and Requirements, dated May 1993.
2. **COST ELEMENT** - A cost or expense element is a particular aspect of cost that is incurred such as wages, depreciation, utilities, material purchases, and others. These cost elements are collected by the accounting system as actual expenses are incurred during the performance of work.

3. **PRICES** - The term "price" is used to mean the amount or total cost that a customer is charged for a product or service. When a fixed price has been associated with a complete item, product, or service it is referred to as a "unit price". The quantity or number of units completed multiplied by this unit price will equal the amount the customer is billed.

4. **RATES** - Rates are the established or estimated amounts for categories of expenses expressed on a unit of measure basis (such as rate per hour, or rate per unit). Various types of rates are used such as direct rates, indirect rates, general and administrative rates. Each of these rates represent a category of like expenses.

5. **DIRECT LABOR HOUR RATE** - The fully burdened cost per direct labor hour used as the basis for establishing stabilized rates for customers of Depot Maintenance. The direct labor hour rate is computed by dividing the sum of all labor, non labor, and material, direct, indirect, general and administrative expenses, by the total number of direct labor hours to be accomplished.

6. **DIRECT LABOR HOUR (DLH)** - DLHs, sometimes referred to as Direct Product Standard Hours, are the number of man-hours required to perform the direct work on a product, or to perform a billable service for customers. Direct labor hours include the maintenance, repair, overhaul, test, and related direct production effort that follows the established sequence and content of work necessary to accomplish the billable job as required by the applicable DoD or Service maintenance standards.

7. **STABILIZED RATES** - The fully burdened cost per direct labor hour used in the Defense Business Operations Fund organic depot budgets.

8. **COMPETITION RATE** - Or bid rate is the break-even rate used by government depots during public-private workload competitions. It is calculated in accordance with the procedures outlined in the DoD "Cost Comparability Handbook," and includes the projected actual costs anticipated to be incurred in accomplishing the work, as modified by specified cost comparability adjustments.

HOW IS DEPOT MAINTENANCE FUNDING SPENT?

Depot maintenance funding is provided to the Military Services in appropriations through the budget process. These funds are expended primarily in either organic Service Depots included within the Department of Defense, Defense Business Operations Fund (DBOF), or through various contracting arrangements with the private sector. The contracting is directly from the Military Services to private

sector companies for major maintenance of weapon systems (such as selected aircraft, vehicles, or ships). Each of the Services has its own organization structure for the management of these major maintenance contracts. Although each Service differs somewhat in its management approach, these contracts are usually issued through private-private procurement competitions or sole source procurements conducted under Defense and Federal Acquisition Regulation (DFAR/FAR) procedures. Examples of these include Army National Maintenance Contracts and ship overhauls in the Navy. In addition, other depot maintenance commercial support occurs through arrangements such as Contractor Logistical Support (CLS), and special or interim contracting arrangements.

Each of the Service Inventory Control Points (Supply Centers) purchase components, depot level repairable items, and maintenance and repair services from commercial sources (for some commodities). These ICPs are also among the largest customers of the DBOF organic depots.

However, as depicted in figure F-1 below the majority of the funding is either through the organic depots or in commercial private-private workload competitions.

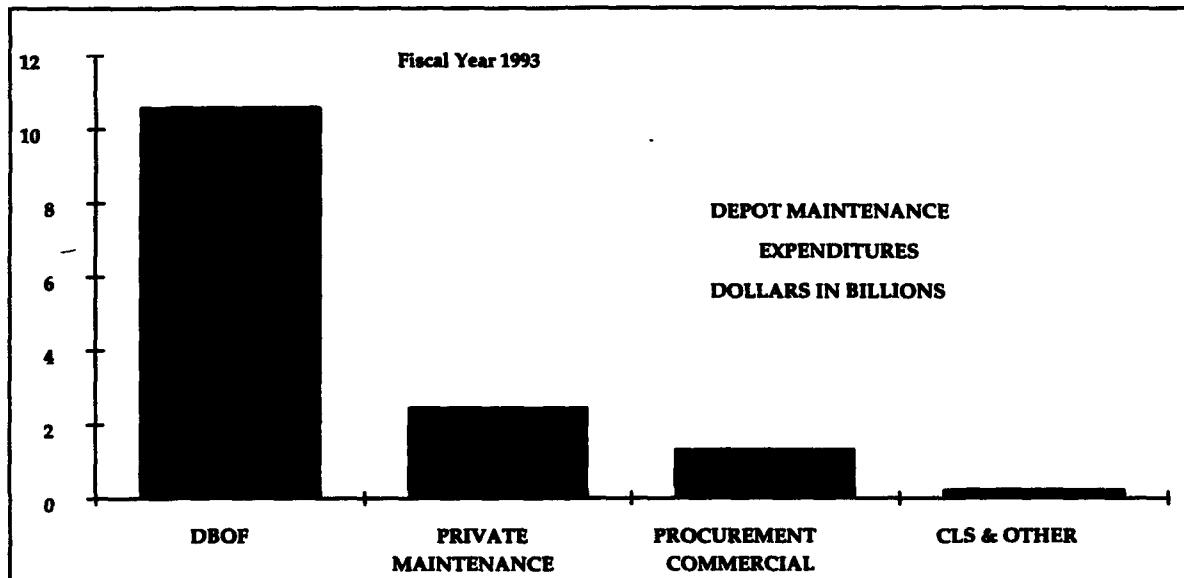


Figure F-1

There are inconsistent definitions applied within DoD as to what funding and programs are properly included within depot maintenance. These differences occur because of the various overlapping DoD systems and congressional reporting procedures (financial, logistics, acquisition, etc.). Within the Defense Business Operations Fund, annual budget expenditures categorized as depot maintenance range from \$12 billion to \$13.5 billion. However, these totals do not include all commercial

depot maintenance contracts (such as Army National Maintenance Contracts and private ship repairs). Further, the DBOF funding also includes programs conducted at DBOF depots that normally are not considered to be depot maintenance such as the receipt, handling, and storage of ammunition, and new manufacturing functions conducted at Army Arsenals.

Using the generally accepted definitions the Task Force found that approximately 68 percent of depot maintenance workload is executed within government depots and the remaining 32 percent (average from FY 1990 through FY 1994) is accomplished in private sector depots. Total annual depot maintenance funding (reported in response to Task Force inquiries) ranged from a high of \$15.9 billion in FY 1992 (driven in part by supplemental appropriations from Congress following Operation Desert Storm) to a low of \$13.9 billion in FY 1994. Average annual depot maintenance spending (both DBOF and other) was \$14.94 billion for the five-year period reviewed.

These findings are consistent with those reported during the last several years by DoD, General Accounting Office studies, and other reports. Depending on what definition is used for depot maintenance the percentage performed "in-house" ranges from 65 percent to 70 percent annually.

However, some would argue that percentage calculations should include the total funding spent annually in the private sector to support depot maintenance functions. Under this approach dollars spent at organic depots for parts and components (used in the repair process) are also included when calculating the percentage of private repair work. When this calculation is used the 65/35 public/private ratio becomes nearly 50/50.

At the rear of this appendix are attachments summarizing:

- Depot maintenance funding, as submitted by the Military Services, for fiscal years 1990 through 1994.
- Depot maintenance foreign military sales and foreign depot maintenance contracts.
- Defense Business Operations Fund costs and revenues proposed for FY 1995.
- Capital investments in organic depots.
- Capital investments in selected private sector companies.
- Civilian end strength reductions within organic government depots.

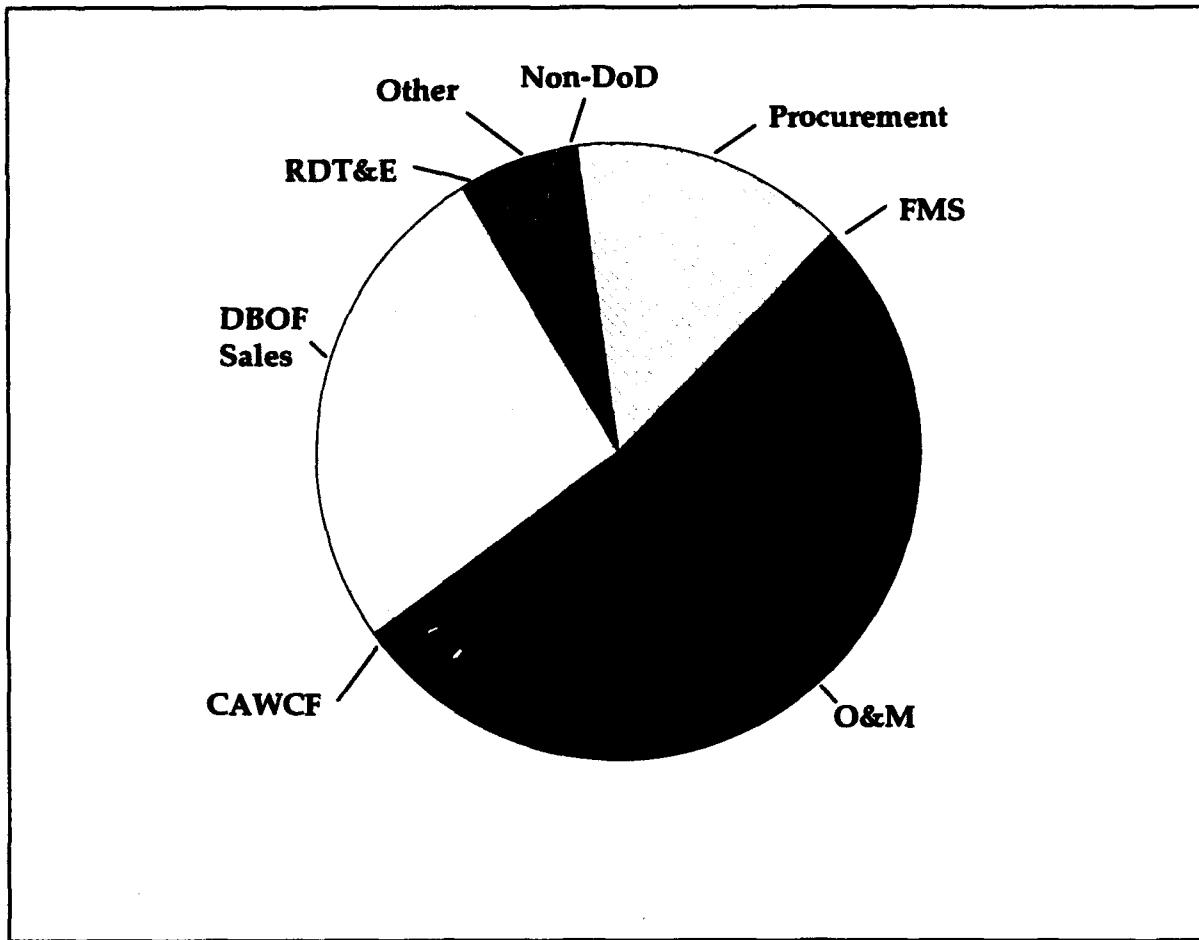
Funding

The Task Force finds that annual depot maintenance funding currently averages \$14.94 billion and includes:

- Approximately \$10.6 billion annually within the DBOF organic depots.
- Approximately \$1.0 billion in commercial maintenance contracts annually through the DBOF.
- Approximately \$3.3 billion in commercial depot maintenance work and commercial procurements associated with depot maintenance (excluding organic depot parts and supplies).
- Although not included in the estimates above, contractor logistics support (CLS) and integrated contractor support (ICS) should also be included within the Depot Maintenance category.

DBOF Funding

As noted above, the majority of depot maintenance funding is executed through the organic Service depots. The DoD organic depots (formerly the Service Industrial Fund Depots) were incorporated within the Defense Business Operations Fund (DBOF) in FY 1991. These depots continue to be managed by their parent Military Service. However, funding (cash collections and disbursements) now flows through the consolidated financial structure of the DBOF. DBOF funding is derived from orders placed by customers (Air Wings, Army Divisions, the Fleet) using regular DoD appropriations. The sources of this funding are depicted in Figure F-2.



Source: The FY 1994 Column of the FY 1994 President's Budget Submission to Congress

Figure F-2
Depot Maintenance Funding in the DBOF FY 1994

<u>DBOF Source of Revenue</u>	<u>Percentage</u>
O&M Appropriations	50.4%
Procurement Appropriations	14.5%
DBOF Internal Sales (mostly Supply)	26.3%
RDT&E Appropriations	1.9%
Conventional Ammunition Capital Fund	0.7%
Foreign Military Sales	1.5%
Other Service Appropriations	3.9%
Other DoD and Non-DoD Orders	0.8%
Total FY 1994:	100%

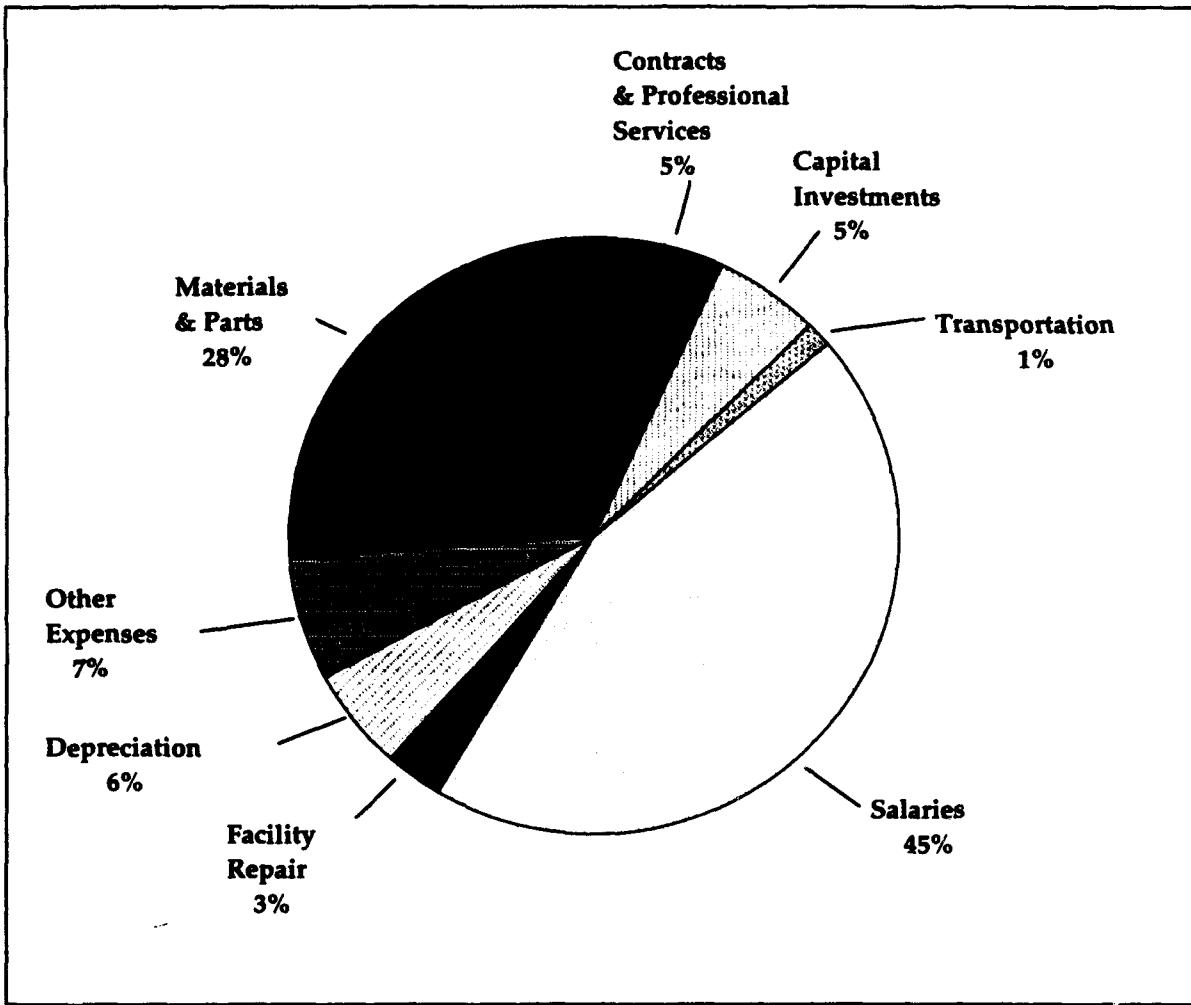
Within DoD, the depot customers are responsible for determining and justifying the level of maintenance work, services, or products they require in order to support the operational tempo and contingency needs of the Forces. Under Title 10, United States Code, the Secretaries of the Military Services are tasked with the responsibility of training and equipping the Armed Forces. They do so by allocating budget authority to depot maintenance during the budget process.

To assist the Service customers in programming their budgets DoD establishes stabilized rates and "locks in" the cost of organic depot maintenance by establishing composite rates per Direct Labor Hour (DLH) during the budget formulation process. DoD can then ensure that customer budget requests submitted to Congress are in balance with the actual anticipated costs projected to be incurred by the depots in accomplishing the required level of work the customers have specified. These stabilized rates are maintained for all new customer orders accepted during the fiscal year. The use of stabilized rates protects the customers from "cost swings" that may occur during execution and at the same time protects readiness by ensuring that customers will have sufficient funds available to pay the "bill" for the maintenance services they require.

During budget execution, which usually begins nine months after the final stabilized rates are set, customers receive the funding from enacted congressional appropriations. The customers then forward work or project orders to the depots to finance their depot maintenance requirements. These orders are then accomplished on a fixed price basis because the rate has been "stabilized" for the customer. Should actual costs be less than what was anticipated the depot will incur a profit. Conversely, if actual costs exceed those anticipated a loss will occur. If losses or profits occur during a fiscal year, the subsequent fiscal year rates will be adjusted by either a positive or negative surcharge. These surcharges either recoup the loss or rebate the profit back to the customer. In this manner the DBOF both protects execution flexibility and readiness, and also ensures that the full cost of the goods and services is eventually paid by the customer.

The stabilized rates are the fully burdened cost per direct labor hour and include all anticipated costs and surcharges. The direct labor hour rate is computed by dividing the sum of all labor, non labor, and material direct, indirect, general and administrative expense rates, by the total number of direct labor hours to be accomplished in the work, based on engineered or historical product standards.

During the assessment of cost the Task Force reviewed how a standard dollar of revenue is spent in the organic depots. Figure F-3 depicts costs at an Army depot in fiscal year 1993.



Source: The FY 1993 Column of the FY 1994 President's Budget Submission to Congress

Figure F-3
Army Depot FY 1993

The chart above depicts costs in broad categories and reflects the actual distribution of expenditures reported in accounting systems. In the attachment section of this appendix are examples of Navy, Marine Corps, and Air Force depots.

During the review, the Task Force found that the fundamental patterns depicted in Figure F-3 above are the same for most depots. However, cost patterns and contracting procedures do differ by commodity group. The Task Force review assessed depot maintenance within four broad commodity groups. These were: (1) Fixed Wing Aircraft, (2) Ground Support Equipment and Rotary Wing Aircraft, (3) Missiles and Electronics, and, (4) Shipyards. The differences found in these groups are due to a number of factors including:

- The nature of the work itself is the major influence on cost patterns and contracting procedures. Examples include how labor-intensive the work is, or whether the work is typically very large projects such as ship overhauls or small quantity batches such as in the case of many types electronic components. Also, if the nature of the work requires high levels of supplies, parts, and replacement components.
- Geographic considerations that impact ship repair and maintenance. The homeporting patterns and deployment schedules of the Naval Fleet make it necessary to restrict considerations of overhaul points to certain areas (coast lines).
- The existing structure of the overall U.S. industrial base can impact both cost and management decision parameters. Examples include the availability of nuclear capacity in shipyards or specialized facilities such as dry-docks.
- For some commodities, shipyards and major weapon systems like tanks and tracked vehicles, a high level of initial capital investment is needed in facilities and equipment in order to be qualified and capable to bid on the work.
- Changing technology that reduces maintenance requirements through increased reliability.

Elements of Expense

Within the organic government depots customer orders or direct reimbursable accounts finance all business expenses and industrial operations including:

-wages and salaries
-benefits to employees
-disability compensation
-severance pay
-travel and Per Diem
-material and supplies
-parts and components

-depreciation charges
-transportation costs
-fuel expenses
-parts and equipment
-ADP & Telecommunications
-facility & equipment repair
-facility maintenance

-fire, police, security	-consultant services
-accounting, personnel	-headquarters costs
-training and tuition	-other engineering support
-trash and snow removal	-mobilization costs
-minor construction	-military labor costs
-capital investments	-other military related
-utility charges	- non-business costs
-subcontract costs	-host expenses (running a
-rent and leases	military installation)

The list above is not complete (see attached chart of accounts) but it does represent the major elements of expense or costs in the organic depots. In addition, organic depots have capital investment budgets (also funded through rates) that finance the purchase of new and replacement industrial plant equipment and tooling, purchases of software and hardware for ADP & Telecommunications requirements, minor construction. Pollution prevention and remediation equipment and related minor construction needed to meet OSHA and EPA requirements is also funded through the capital budgets. However, environmental restoration is not funded through the DBOF. Environmental restoration (for identified "super fund" sites as an example) is directly funded outside of the depot maintenance program.

Major facility construction costs are separately funded through the Service Military Construction appropriations. However, in depot public - private competitions depreciation charges for facilities are included within the depot's cost proposal.

Prior to establishment of the DBOF, the industrial funds operated on a day-to-day basis very much as they do today. The primary difference is that under the financial policies of the DBOF cash management has been consolidated (collections and disbursements) and changes such as the addition of capital investment budgets, accelerated full depreciation charges (on a straight-line basis for all capital including major facility construction), and inclusion of headquarters overhead costs moved the organic depots closer to the structure seen in the private sector. A history of DBOF and its accounting changes is included as an attachment to this appendix.

Differing Expense Elements

With the exception of the last four items (the special military-related costs) listed above as elements of expense, all the costs are common between the public and private sector.

However, some fundamental differences remain in the cost element structure of the organic government depots and that of the private sector. Costs that occur in the private sector that have no direct equivalency in public depots include:

-Profits
-Federal Income Taxes
-State Income Taxes

-Cost of Money
-Property Taxes
-Casualty Insurance

In addition, when private contracts are issued DoD must pay the cost of contract quality assurance (government inspectors and auditors). This requirement can cost up to 2 percent of the total value of the contract. Further, responding to this government monitoring is often mentioned as a considerable cost burden that private sector companies must endure. Detailed review of comparability issues is included in another section. During public - private cost competitions some of these differences are adjusted for and some are not. This is discussed in greater detail in a later section.

Factors That Influence Cost

Unique factors that may influence total cost and efficiency in either public or private depots are many and varied. Some of these are actually competitive advantages or disadvantages rather than differing cost factors such as the quality of management, knowledge of the work, the level of technology employed, or the skill of the work force. But on a more generic basis it is possible to identify several structural differences that impact on cost.

- **PROFITS AND TAXES.** Private sector companies must achieve a rate of return on investments or they cannot stay in operation. Profit margins vary from year-to-year. The Private Industry Support Group provided the Task Force with information on the profits achieved by the U.S. Aerospace industry during the period from FY 1988 through FY 1992. During 1992 profit, expressed as a percentage return on sales, ranged from a low 2.1% to a high of 15.3% (excluding companies that incurred losses). The average during FY 1992 for the 23 companies reported who made a profit was 7.8%. During the entire five-year period the average was over 6% for all companies. Corporate federal income tax rates (currently 34%) also impact cost. Included within the profit margin is a factor to cover both federal and state income tax expenses.
- **SUBCONTRACTING.** Many private firms operate with a large support structure of subcontractors who perform portions of the work or provide selected services or products used by the prime contractor. When subcontractors are used the profit margin requirements of the subcontractors must be passed on as an added expense within the overall cost structure of the prime contractor. Public depots on the other hand are organized as multiple commodity, integrated industrial facilities that typically have most, if not all, of the required supporting shops within the depot. These support shops work "at cost" and do not add independent profit margins to their costs.

- **PERSONNEL PRACTICES**. For public depots the cost of excess personnel due to the government's inflexibility in the execution of reductions in force. The reduction in force procedures must be approved by the depot's Chain-of-Command and if 50 people or more are involved, then congressional notification is required. These procedures often result in long delays or denial of the authority to reduce the work force. When this occurs the depot is required to retain personnel for which there is no available workload. Essential, excess personnel are charged to overhead accounts, until they are removed from the payroll. The cost of these excess personnel flow into and increase current costs, efficiency, and subsequent stabilized rate development.
- **NON-MAINTENANCE MISSIONS**. Unique cost drivers identified by the public maintenance activities include: engineering design support, supply functions performed for other activities, military salaries for that period of time spent performing non-depot duties such as physical fitness, retirement ceremonies, and parades. Development and testing of mobilization planning and support provided during wartime, special studies such as the Base Realignment and Closure and other DoD-wide and Service specific logistic studies, GAO and Inspector General studies and audits, and others the cost of which are absorbed by the depot. The cost of test pilots performing final acceptance tests of the work performed by private sector firms. On the other hand, some benefits that accrue to the public depot activities are paid by other government activities. These costs include civilian retirement, state unemployment compensation payments, insurance, and impact aid paid to local communities in lieu of property taxes.
- **GOVERNMENT SURVEILLANCE**. Unique cost factors identified by the private sector entities include the Milspec 9858A quality assurance costs and the cost of Defense Contract Management Command (DCMC) inspectors approving over and above work that exceeds the original statement of work; although the government pays the salaries of DCMC personnel as part of the contract cost, the associated inspection and approval process tends to shut down the job or production line thereby increasing the costs associated with down time.
- **PURCHASING FLEXIBILITY**. Private sector procurement regulations and procedures are more streamlined and are able to utilize just-in-time inventory deliveries and other cost savings techniques that result in lower costs for materials and supplies. Further, the private depots are often provided access to the DoD Supply system or provided government-furnished equipment or materials when it is cost-advantageous to do so. This option to use the most cost effective method can, in some instances, be a competitive advantage. Public depots on the other hand, must use the DoD Supply system which is sometimes slow and includes surcharges needed to pay the overhead costs of the Supply system.

- **EXCESSIVE INFRASTRUCTURE**. Both the DoD and the private sector have a significant over capacity for depot maintenance and new production. A portion of the public depot capacity is needed for surge or mobilization requirements. However, for the most part these excess facilities and equipment only represent a drain on resources. In this area the private sector has a clear competitive advantage over the public depots. Private sector companies shed, through sale or other disposition action, excess facilities and equipment that are no longer economical to retain. Private companies can do this much more easily than public depots. This is especially true for entire bases or factories. For public depots, the Base Closure and Realignment Commission is the only vehicle currently available to close entire depots.
- **ORGANIZATIONAL STRUCTURE**. There are significant differences in how public depots and private depots are structured. Original equipment manufacturers (OEMs) usually have very large overhead staffs for engineering, research and development, marketing, and other functions. These OEMs usually have the highest overhead costs and are heavily facilitated. Public depots are also heavily facilitated and are often large-scale, integrated industrial activities with the capability and capacity for multiple commodities. On the other end of the spectrum are private service companies that are specifically organized to have minimum overhead. These service companies do not maintain large indirect staff units, nor do they have large sunk costs in facilities and equipment that must be depreciated or amortized in their cost structure. Consequently, in firm fixed priced bids the organizations with the smallest overhead (the minimum needed to support the work) have a cost advantage.

INDUSTRY CONCERNS

Industry believes that with the exception of minimum levels of depot maintenance capability necessary to support the readiness and sustainability requirements of the Joint Chiefs of Staff contingency plans, commercial weapon systems maintenance services should exclusively be provided to DoD by the private sector. Industry justifies its position on the belief that, ultimately, free market mechanisms provide the optimum solution for providing goods and services at the best value.

Few would argue the virtues of free market mechanisms and the benefits that naturally occur from competition and the entrepreneurial atmosphere created by a free market place. However, with only one "buyer" in the defense market place, and with the varied and complex interrelationships that exist between DoD and the defense industrial base, classical economics concepts do not fully apply.

Further, private industry has been, and continues to be, highly critical of the public depot accounting systems. The criticism ranges from charges that the public

depots do not have reliable systems and cannot account for all costs, to allegations that in contract competitions public depots have hidden or failed to disclose all costs. Private industry cites General Accounting Office studies and Inspector General Reports to partially substantiate some of these claims.

ACCOUNTING SYSTEMS FINDINGS

During this study the accounting practices utilized by the public and private sectors were reviewed. Representatives of the Defense Contract Audit Agency (DCAA) provided briefings on what they have observed and found in their reviews and audits. Each Service provided detailed explanations of their systems, procedures, and policies. Additionally, three major private sector companies provided their confidential disclosure statements for review and analysis. These disclosure statements describe the accounting systems used by these companies, how and what costs are collected, and how their rate and prices are structured. Analysis of the information reveals that:

- Public and Private depots operate under the same basic accounting principles and practices.
- Procedures and reviews in private industry that are required by the Defense Contract Audit Agency (DCAA) are essentially the same as those required within DoD.
- Formal accounting services are not controlled by the depots or even the Military Services. The Defense Finance and Accounting Service provides the accounting support for all public depots, and all annual expenditures are required to be certified in accordance with the Chief Financial Officers Act.

ASPECTS OF THE ACCOUNTING SYSTEM

The following sections discuss in greater detail aspects of the accounting system in each sector:

Job Order Systems

The public depots prescribe to and operate in accordance with the Cost Accounting Standards Board's Cost Accounting Standards, as set forth in the DoD Accounting Manual, 7220.9M. The private depots also prescribe to and operate in accordance with the Cost Accounting Standards Board's Cost Accounting Standards. Neither the public depots nor the private depots have identified any unique difference in costing methodologies. Both the public and the private depots appear to utilize the same cost accounting techniques and postulates. The job order cost accounting methodology has been identified as the primary means of accumulating cost for both

sectors. Within the public depots work is priced at unit cost price for the convenience of customers. Examples of units are engines, airframes, components, etc., that are being overhauled or repaired. Additionally, work is priced based on the cost per direct labor hour.

The Cost Accounting Standards incorporated in DoD regulations (that are mandatory for all organic depots) conform to generally accepted accounting practices. The changes that have been adopted in recent years since the implementation of the Defense Business Operations Fund financial policies have further narrowed the differences between the depot accounting practices and the private sector. These practices are modified somewhat by the leveling factors in the DoD Cost Comparability Handbook. DCAA, has stated that they apply the same standard in their reviews of organic depots as they apply when auditing proposals submitted by the private sector. The organic depots all utilize a job order accounting system to collect costs and expenses. This process has been in use since the first establishment of industrial funds where the funded job order was, in fact, the budgetary authority for the work. Direct labor and material expenses incurred are applied to the job orders using either the completed unit or the percentage of completion method. Currently, differing methods are utilized for the allocation of production indirect and general and administrative (G&A) overhead charges by the Services. DCAA reports that the processes used are acceptable, and are similar to that employed by many private firms.

Depreciation

The depreciation expense attributed to the various types of major work group varies according to the organization's structural makeup. For example, a private depot operation that is structured to operate with minimal overhead has fewer depreciable major assets such as buildings or hangers. The assets owned by this type of organization are usually older with minimal value, accordingly, depreciation expense could be as little as one percent of the total cost of operations. On the other hand, some depot organizations, or original equipment manufacturers are required to support numerous types of work, and are burdened with maintaining large specialized facilities. The depreciation cost associated with this type of organization could constitute a significant percentage of the total cost of operations. Depreciable asset life basis for the public depots is twenty years for plant facilities, ten years for equipment other than automatic data processing items, five years for automatic data processing equipment and software, five years for general purpose vehicles. The private sector depot activities use the Treasury Department Class Life Asset Depreciation Range tables (CLADR). These tables apply to various type of depreciation systems in use. The Modified Accelerated Depreciation System (MACRS) went into effect in January of 1987, prior to that time the Accelerated Depreciation System (ACRS) was in use. Recent changes in the Federal tax code specified a longer life for assets than is applied by the government depots. Public depots have operating leases and capital leases. Leasehold improvements costing over \$25,000 are considered capital assets and are amortized

over a useful life of two hundred and forty months. The public depots expense operating leases. Some private depot activities capitalize leases if the value if \$1,500 or more, the lease purchase amount is then amortized over the useful life of the lease or ten-year period, whichever is less. In summary, it is apparent that the public depots depreciate the cost of their plant facilities approximately twice as fast as the private depot activities. In addition, the public depot activities have established a greater capitalization criteria than the private depot activities. Consequently, the public depot rate of depreciation expense allocated and the amount of operating leases expensed to the cost of operations is usually greater than that of the private depot activities.

Retirement Costs

Public depot activities accrue all funded retirement costs in their general ledger accounts. The funded retirement costs are a percentage factor (labor acceleration rate) added to the locally established labor rates. The labor acceleration rate if applied to all regular time civilian labor, and to the premium portion of all civilian labor (performed on a holiday, odd shifts, etc.). In execution, the direct and indirect civilian labor charges will be accelerated when the labor distribution is applied to the job orders. Retirement plans vary throughout the private sector. However, a single major private OEM was reviewed as a point of comparison. That company stated that its principal retirement plan is a defined contribution plan. Under this plan approximately three percent of an individual's salary is funded. This is supplemented with a 401K plan in which a maximum of four percent of an individual's salary can be deferred. The private depot activity will make half of the contribution. In practice only about fifty percent of those eligible participate in the plan.

Public depot maintenance activities unfunded retirement costs associated with the Civil Service Retirement System are not funded nor accounted for by the Department. However, when a public depot maintenance activity bids on a public/private competition an adjustment is made to account for the unfunded retirement costs attributed to both direct and indirect labor costs in accordance with the guidance contained in the Cost Comparability Handbook. A representative private depot maintenance activity stated that it maintains a defined benefit plan for a small number of its employees. The unfunded retirement costs associated with this plan are not accounted for. In summary, it appears that neither the public nor the private depot maintenance entities fully account for the unfunded retirement costs. With the unfunded retirement cost adjustment factor applied to public depots, it appears that reasonable steps have been taken to make fair comparisons between the sectors.

Bid Preparation Costs

Typical public depot bid preparation and related costs generally consist of the labor and material cost associated with the following actions: bid and proposal office staff, supplies, TDY, proposal team selection and kick-off meetings, receiving and reviewing the request for proposal (RFP), RFP questions, bid conference, bid decision process, cost data gathering and analysis, technical and cost document development, make or buy decision process, various team reviews, finalize proposal, price review, corporate board review, document reproduction, bid submission documentation, and responses to the seller support team review. The aforementioned items address work breakdown, structure of the direct labor effort, material plan, and technical cost volumes of the formal bid process. These costs are either recorded in an overhead cost pool and are allocated to the bid proposals or in a G&A pool and are allocated the entire workload at the depot. These costs can range from a low of 2%, to a maximum of 12% of the contract value depending on the size of the contract.

A private depot also records the labor and other costs associated with preparing a bid in a G&A cost pool where the cost is allocated across the workload. There appears to be little difference between the process or means of accounting for these costs between the sectors.

Cost Realism Checks

Cost realism checks are performed by the public depot maintenance activities. Public depot activities maintain an informal, in-house organization that follows prescribed regulations and directions or follows a specified internal process for performing the cost realism checks. The Defense Contract Audit Agency performs cost realism checks during contract pre-award audits. In brief, the process followed by the public depot maintenance activities consist of comparing historical, current, and prospective data (hours, material, and rates) in order to validate that the cost is realistic for the work. In addition, the cost realism analysis examines the overall cost proposal in order to see if it reflects a clear understanding of the requirements, and is consistent with the various elements of the offer's proposals.

Information regarding the private sector depot entities reveal that a management team is constituted to perform bid proposal cost realism checks which are then subject to corporate committee approval. The costs associated with the cost realism test is included in the rate and contract bid proposal. In summary, the processes for performing cost realism checks in both the public and private depot maintenance activities produce the degree of assurance specified by the organization's respective management direction. A description of a major private firm's cost realism review process is contained in an attachment to this appendix.

Property Taxes

Public depot maintenance activities are exempt from state and local government property taxes. However, many DoD depots are actually tenants at a Host base (or are required to serve as a Host) where they do pay an equivalent cost in base operating support charges which provide for roads, snow and trash removal, police, fire protection, and repair and maintenance of common facilities and utilities; similar services to those provided by local government units financed by property taxes. In addition, an impact aid adjustment factor is included in the cost comparability process whenever a public depot competes with a private depot.

Even though private depots are subject to property taxes, they often receive the benefit of favorable property tax rates, abatements, or deferments from local governments in exchange for locating in the community. In conclusion, the differences in operating expenses between the two types of depot entities in this area is negligible when the cost comparability adjustments are taken into consideration.

Cost Of Money

Public depot maintenance activities do not engage in long-term depot financing. However, private depot maintenance activities do engage in the practice. For example, the interest expense portion of a long-term capital lease would be included as a factor in the rate of investment recovery formula used to calculate the profit line item within the forward pricing rate agreement. Operating lease expenses are included in the overhead and bid proposals.

COST COMPARABILITY

Numerous studies have now demonstrated that in terms of overall cost competitiveness there appears to be three general levels.

LEVEL ONE - Non-prime service contractors (that are not original equipment manufacturers) or independent subsidiaries or divisions of prime contractors. These companies have reduced overhead and have been organized to minimize costs through local tax incentives, low cost facilities, limited support organizations, reduced employee fringe benefits, or other cost reduction measures. These companies often pursue contracts where substantial assets are provided to the winning bidder such as significant amounts of Government Furnished Equipment and Supplies (GFE) or government-owned - contractor-operated facilities (GOCO). Since government owned data packages are supplied to bidders these companies are often extremely cost competitive and beat out organic depots. On the public sector side organic depots that have pursued competitions aggressively and have maintained relatively high capacity utilization rates also fall within this most competitive group.

This situation differs by commodity group and (to a lesser degree) by regional economic factors. As an example, in shipyard work all qualified contractors must have a certain level of facilitization in order to perform the basic work. Although level one contractors in the shipyard sector are smaller than the large OEMs and may rely more heavily on subcontractors for portions of the work or support processes, they still require considerable facilities. Further, when industries are located in regions of the nation with large industrial bases and high prevailing labor rates, depot maintenance firms must offer competitive salary and fringe benefit packages in order to retain a competent and highly skilled work force.

LEVEL TWO. - Includes most of the organic depots. The inherent competitive advantage of not having to make a profit, pay taxes, or maintain large engineering and design staffs, make organic depots with moderate to relatively high capacity utilization rates competitive.

LEVEL THREE - The original equipment manufacturers (OEMs) who because of the need to retain large engineering, R&D capability, and other overhead structures, and to make a profit on sales, are the least competitive when cost is the primary basis for selection for maintenance and repair contracts.

However, insufficient attention has previously been paid to alternate acquisition techniques that could improve the overall life cycle costs for weapon systems, reduce maintenance costs, and strengthen the overall industrial base. Further, when weapon systems are in the late stages of production, the most cost-effective means of accomplishing upgrades or major modifications to the early deployed versions would most likely be in the OEM facility. These considerations would be the "best value" approach rather than simply lowest cost.

Contracting and acquisition policies should take into account the unique requirements of the various commodity sectors (aircraft, shipyards, etc.) and special requirements resulting from force deployment patterns. An example of this type of consideration are Fleet deployments where ship availabilities make it impractical to not perform all modifications and upgrades concurrently with maintenance and repairs.

ANALYSIS OF CONTRACTS

During this study twenty-eight contracts and over 105 bids submitted under these contract cost competitions were reviewed to identify trends applicable to cost and cost comparability. The contracts reviewed ranged from \$2.2 million to \$62 million for the base workload (excluding options), and included an equal number of contracts won by private bidders and public bidders. The total value of the contracts studied was \$404 million (base price without options). The work performed under the contracts included ship overhauls (both surface ships and submarines), fixed wing aircraft contracts, aircraft engine contracts, electronic component contracts, and ground vehicle

system contracts. Of the contracts reviewed, those won by the private sector accounted for 23% of the total value of the awards. The following sections provide a summary of the data and trends identifiable.

Total Cost Per DLH

This is result of dividing total contract cost by the total number of direct labor hours estimated to accomplish the work by the bidding depot (private or public). There were significant differences by commodity group (aircraft, shipyard, ground support, electronics) ranging from a low of \$38.20 per hour to a high of \$163.60 per hour. However, the variances between the commodities were greater than the variance between public and private bidders within the separate commodity groups. The pattern reflected in the data substantiated the discussion above under "cost comparability".

DLH Estimates

Within all 28 competitions reviewed the estimates of the number of direct labor hours (DLHs, sometimes referred to as direct product standard hours) required to accomplish the work specified in the Request For Proposal or Invitation For Bid, ranged significantly. Private bids differed from public bids from a low of 3% to a high of 300%. The average private bidder exceeded the public bid by 103% in the number of DLHs bid. Further, within the private sector bids alone the estimates of DLHs widely ranged by competition. In the competitions with the lowest range the private bids only differed 16%. In the competitions with the widest range the private sector bids ranged 283%. The average variance in private sector bids was 100%. Such a wide dispersal pattern was not evident within the range of public sector bids.

Labor Rates

This is the cost per hour for direct labor (not the fully burdened rate discussed above). The data indicates no particular pattern favoring either public or private bidders. The prevailing labor rates in the local job market appear to be the driving factor. However, in the shipyard competitions reviewed private sector employers had slightly lower rates (although the sample used is not considered large enough to be statistically significant).

Direct and Indirect Costs

The range of direct and indirect costs between public and private bidders was not large. Material costs did not appear to be a significant factor in competitions. The following averages were reflected in the data collected (note, in private bids "Other

"Direct" which is primarily subcontracting costs were combined with reported "Direct" costs):

Public: Direct 44%
Indirect 56%

Private: Direct 42% (includes 18% "other direct")
Indirect 58% (includes indirect material)

Profits

The pattern of profits or rate of return in private sector bids followed the following patterns:

- Large Aircraft Contracts (\$10 million or greater) ranged from 5% to 16%, and averaged 12%.
- Ground Support Equipment and small Aviation contracts ranged from 4% to 10%, and averaged 7%.
- Shipyard contracts averaged 11%.
- Most missile and electronics contracts did not have profit specified in the proposals.

Form Of Contracting

Over 80% of the contracts were conducted on a firm fixed price basis. The remainder were Cost Plus, Time & Material, and other combinations of these contracting techniques.

DCAA Audits

DCAA conducted audits on 40% of the total contracts and 60% of the larger (over \$10 million) contracts for both public and private bidders.

Total Price

For those contracts won by public bidders; private bidder overall prices exceeded the winning public bid by a range of 12% to 334%, with an average of 94%. With the exception of slightly higher (but consistently higher) indirect costs the predominant factor appears to be the number of direct labor hours bid. Further, the spread between private bidders is almost the same as that between public and private

bidders (except indirect variances become larger) with DLH estimates being the greatest factor.

CONCLUSIONS

Public and private sector pricing appears, in general, to follow the following competitive pattern:

- Level One - Non-prime service contractors (that are not original equipment manufacturers) or independent subsidiaries or divisions of prime contractors. These companies have reduced overhead and have been organized to minimize costs.
- Level Two - Includes most of the organic depots which have a larger overhead than service companies or depots designed to produce a limited number of products, but have less infrastructure and overhead than OEM's.
- Level Three - The original equipment manufacturers (OEMs) who because of the need to retain large engineering, R&D capability, and other overhead structures, and to make a profit on sales, are the least competitive when cost is the primary basis for selection for maintenance and repair contracts.
- Although indirect costs are consistently higher in private bids this factor alone would not be sufficient to result in public bidders consistently winning.
- The data indicates that the bidders' understanding of the work required to be accomplished (due to the wide range in direct labor hour estimates) is the predominant factor. Further, the range indicates that the incumbent depot (usually the public depot) has an excessive advantage.
- The Statement of Work (SOW) sections of the RFPs are not sufficiently developed, or in the process insufficient related information is provided to bidders to ensure that private or non incumbent bidders can properly estimate direct labor hours.

ANALYSIS OF COMPLETED CONTRACTS

A total of 55 contracts that had a base year or base plus option period completed in FY 1992 or FY 1993 were reviewed. Findings included:

PRIVATE

- A total of 17 out of a total of 27 contracts won by the private sector experienced cost increases.
- Private sector cost increases ranged from a low of 0.2% to a high of 162% (increase in final price over bid price for first year).
- The average private sector cost increase was 49.8%. Total cost increases (sum of all contracts) was 54%.
- Approximately 99% of the private sector cost increases were determined to be approved scope changes to the SOW.

PUBLIC

- A total of 10 out of 21 contracts won by the public depots experienced cost decreases ranging from -7% to -39%. The average cost decrease was -16.2%.
- A total of 12 out of 21 contracts won by the public depots experienced cost increases ranging from .2% to 63%.
- The average cost increase by public depots was 19.7%. Total cost increases (sum of all contracts) was 5%.
- Approximately 96% of the public depot cost increases were determined to be approved scope changes to the SOW.

No significant schedule slippages or negative impacts based on schedule performance was provided for either public or private depots.

CONCLUSIONS

- Data indicates that both public and private depots are meeting basic performance requirements. Because essentially all cost increases over the firm fixed price were approved changes by the customers.
- In 36% of the contracts won by public depots further economies were achieved after the competitive process.
- Strong evidence that Statement of Work (SOW) packages are not of sufficient quality to ensure all work requirements are identified.

COMPETITIONS

Although the Task Force believes that DoD as a "buyer" of services receives an advantage through competition between suppliers, most of the Task Force members have reservations regarding public - private workload competitions.

RESULTS OF COMPETITIONS

Since competitions between public and private depots first began a number of trends have emerged that have been documented in numerous studies.

The Army, between FY 1991 and FY 1993 conducted 32 public-private competitions (PPC). Half of these awards went to Army and half went to the private sector. Further, Army estimates that repair costs prior to competitions were 33 percent higher than the award value of the contracts issued. This would indicate that significant cost avoidance occurs from competition. This experience also indicates that efforts by DoD such as the issuance of the "Cost Comparability Handbook" and the assignment of DCAA to conduct pre-award audits of accounting systems and price proposals have resulted in substantial leveling of the playing field.

The Navy, which has the longest history of competitions, has had mixed results. Initially, in shipyard competitions the split between public and private awards was relatively even. However, since the issuance of Navy and DoD guidance on costing procedures for PPCs, the number of surface ship awards won by public depots dropped significantly. Submarine competitions from FY 1986 through FY 1991 were won primarily by organic shipyards (22 out of 30); however, in FY 1992 and FY 1993 that trend has reversed. In shipyard contracts homeporting requirements restrict competitions by coast, and nuclear capability considerations often result in a lack of private sector bids resulting in assignments rather than competitive selections. Also, given the massive capital investment required for shipbuilding and the absolute necessity to maintain a U.S. shipbuilding industry the Navy must, to some extent, consider the viability of the industry in awarding maintenance contracts. In Naval Aviation and in Marine Corps depot contracts the organic depots have been competitive and the results have tended to retain the work in the incumbent sector. The organic Aviation depots won 5 of 12 PPCs, and Marine Corps won 4 of 5 PPCs.

The Air Force has had the highest percentage of awards won by their organic depots and believes that competitions have significantly reduced repair and maintenance costs. Air Force won 65 percent of the competitions (88 percent of the total workload) through FY 1993.

Cost Comparability Procedures

DoD has made a series of efforts to ensure that costs are compared on a fair and consistent basis between public and private bidders. The Services believe that the issuance of the "Cost Comparability Handbook," and the assignment of DCAA to conduct pre-award audits of accounting systems and price proposals have resulted in a substantially level playing field. The Navy contends that since these competition rules were adopted (eliminating the practice of bidding on the margin) the number of surface ship competitive awards won by Naval shipyards have decreased dramatically. Army points to the even number of awards between public and private depots in Army competitions as strong evidence of a level playing field. The Air Force believes that prudent steps have been taken and that the current rules allow the offeror with the true competitive advantage to win the competition. However, the Air Force advocates working with the private sector to identify any additional changes needed to improve the process.

The Army and Marine Corps also cite inherent restrictions on government depots that restrict their competitive posture. The primary factors listed include constraints on both hiring and reduction of personnel and the requirement to use the DoD supply system.

Level Playing Field Findings

As discussed above, there remains numerous concerns on the part of Industry on how level the playing field actually is. These concerns fall into a number of areas which are discussed below.

Current Adjustments

The current issuance of the DoD "Cost Comparability Handbook" provides for ten major cost adjustments. However, the primary adjustments to organic depot bids include:

Additions to Public Bids:

- State Unemployment Payments
- Unfunded Civilian Retirement
- Facility Depreciation Costs
- Casualty Insurance
- Impact Aid

Reductions to Public Bids:

- Non-Industrial Fund recurring costs (such as Mobilization Costs, services required to be provided as a "Host" to base Tenants)
- Military Non-Depot Related Costs

The Services, in general, believe that these adjustments have made the playing field level, while the private sector continues to have significant concerns.

Knowledge Of Market Opportunities

Industry contends that because the Military Services decide what workload will be subject to competition and what will not, this provides an inherent advantage in planning and investment strategies. Further, industry complains that the Services often do not compete items widely seen on the commercial market, but instead choose to compete military unique items, often in smaller uneconomical units.

To a certain degree the depots do have a natural advantage in their knowledge of the items that will probably be open for competition. One of the basic reasons the Services have stated for maintaining organic depots is to be a smart buyer in the market place. Consequently, the organic depots can not be totally separated from the buying command, or this expertise is not available. However, each of the Services have organized to separate the "buyers" from the "supplies" in depot maintenance. Further, once the new methodology for CORE has been implemented there will be a greater delineation of what is not contractible than we have had in the past. This should, at the same time, substantially clarify what items are contractible. However, the DoD should do more to give industry advance notice of non-CORE workload that will be open for competition.

Qualification Of Repair Sources And Specifications

Industry contends that organic depots are the source of expertise for development of source selection criteria, defining customer requirements or specifications, or identification of Statement of Work packages, giving them an unfair advantage. Actual work specifications and selection criteria are not developed by the depots. These items are developed and prepared by the Inventory Control Points or Project Offices.

As discussed in the item above, to a degree this is inherent in the system. However, the OEM designed the weapon system that is the subject of the bid, usually prepared the corresponding data packages and technical manuals, usually maintained the equipment during initial deployment, and developed the original maintenance requirements and frequency tables under the DoD Weapon System Reliability Program. This does not appear to be a significant factor in ensuring a level playing field.

Responsibility For The Competitive Process And Award

Industry also believes that since the government is both a participant as a bidder and the party responsible for conducting the process and determining awards, public depots have an unfair advantage. They believe that this is especially true at Air Force Depots where in the past these competitions were conducted at the local Air Logistics Center (ALC) level.

This type of concern demonstrates why Industry may never feel comfortable with public-private competitions. In each Service the Contracting Officer is responsible for making award determinations and the Defense Contract Audit Agency (DCAA) conducts pre-award audits. Each Service has separated the "buyers" from the "depots". In the past the line between these groups has been less distinct in the Air Force than in the other Services. Subsequent to complaints of this type, the Air Force has revised its procedures and issued new policy to ensure that all awards for contracts where an Air Force depot is a bidder are not controlled at an ALC. However, industry remains convinced that a natural bias will always remain under these circumstances.

The Task Force believes that until the new Air Force procedures are put to the test it is too early to tell whether these changes will be sufficient to convince all parties of the fairness of the process.

Different Rules Govern Requests For Proposals

Industry contends that different rules exist for organic depots under the RFP than are required for private bidders. The process does differ for public and private bidders. Private bidders submit a firm fixed price bid where free and open market competition is the primary vehicle for assuring cost realism and competitiveness. Public sector offerors must also submit firm fixed price bids. However, they are audited by DCAA as though they were cost-based bids to ensure realism. No formal cost realism audit is conducted on private sector bids by DCAA.

However, our analysis shows that the same statement-of-work, delivery schedules, work specifications and requirements, and basis for award are identical for all offerors. One significant difference is that not all bidders are required to submit a disclosure statement which describes the bidder's elements of expense and accounting procedures. The Navy does not submit disclosure statements, and in many instances smaller private bidders have also not submitted them. The Task Force finds that in any future public-private competitions all bidders should be required to submit a standard disclosure statement.

Waiver Of Public Stabilized Rates

Industry contends that the government depots are allowed to waive their normal stabilized rates and to instead base their bids on actual and estimated costs at the time of bid. However, in the process this results in some true indirect costs being subsidized by noncompetitive workload.

The government depots are not required to use their Defense Business Operations Fund (DBOF) stabilized rates for competitive bids. Organic depot bids are prepared following the Cost Comparability Handbook which allows exclusions of certain costs. The DBOF stabilized rates include all costs incurred at the depots, and in addition include other costs not associated with the actual depot operations that would be required for completion of the contract workload. These other costs include DoD directed surcharges, recoupment of prior year losses, rebates of prior year gains, congressional or DoD directed cash losses, losses resulting from military requirements, military pay and related costs, and other factors. All of these additional costs, which are included in DBOF stabilized rates, would not be applicable for cost competition purposes.

However, by not using the DBOF stabilized rates as a starting point an appearance, whether justified or not, of not including all applicable overhead costs occurs. The government does not intend to allow CORE workload to subsidize competitive organic bids. As an alternative to the current cost comparability procedures the organic depots should be required to start with the published stabilized rate, and provide a detailed crosswalk that reflects authorized deductions from that stabilized rate to arrive at the competitive cost per direct labor hour rate upon which their bid must be based. Those items that would be deductible from the DBOF composite stabilized rates would be identified by DoD and published annually during preparation of the DoD budget. Although the authorized exclusions will generally be the same as those currently allowed by the Cost Comparability Handbook, this procedure would be a more direct and auditable process which would ensure CORE workload could not subsidize competitive workload. Current DoD DBOF stabilized rates are issued at the composite Business Area level only. Consequently, this change would require a further delineation of stabilized rates in most of the Services. Currently, only Navy breaks the DBOF composite rate into weighted, fully burdened rates for airframes, aircraft engines, components, missiles, modifications, ship repairs, and others.

As an alternative to the current cost comparability procedures the organic depots should be required to start with the published DoD stabilized rate for their respective business, and provide a detailed crosswalk that reflects authorized deductions from that stabilized rate to arrive at the competitive cost per direct labor hour rate upon which their bid must be based. Authorized deductions would be determined by the DoD DBOF Corporate Financial Board.

Consequences Of Noncompliance

Industry contends that severe consequences occur when Industry fails to comply with government regulations. These consequences range from debarment for FAR violations, to severe financial losses that will occur from under bidding, that could result in a private firm going out of business. Organic depots are not subject to the same penalties.

Organic depots who regularly incur losses become a drain on vital resources for their parent Service. DBOF financial policies require that operating losses be recouped in future year rates. Consequently, a depot that continues to experience net operating losses will encounter ever increasing pressure from both their customers and superiors to reduce costs.

However, operating losses from prior years are not now included in organic depot competitions. As discussed above, if organic depots were required to use DBOF stabilized rates (adjusted for nonbusiness related factors), as the starting point in calculating competitive rates prior year losses for competitive workloads could be identified and added as a surcharge (just as military mobilization costs would be a negative surcharge in computing competitive rates). Once this change was implemented an organic depot that continued to experience losses would become increasingly noncompetitive in the market place, just like any private firm that continues to run at a loss.

To provide a similar consequence for execution results in organic depots to that which occurs in private industry, the financial results of competition operations should be included in subsequent year competitive rates. Using DBOF stabilized rates as a starting point will ensure that organic depots that understate costs to win competitions and subsequently incur losses in contract execution, will have to recoup losses in future year rates.

FUNDAMENTAL POLICY ISSUE

It has been a long-standing basic government policy that the federal government should not enter into competition with the private sector for the production of goods or services. Exceptions to this policy are outlined in Office of Management and Budget Circular A-76. The policy exceptions include, in part, where there is a compelling national defense requirement, and (in the case of existing government operations) whereby cost competitions the in-house operation can demonstrate that the service can be provided at a lower cost than the private sector. However, since the mid-80s Congress has encouraged various levels of competition in the depot maintenance arena.

In the case of depot maintenance workload competitions between public and private depots, the majority of the Task Force finds that public-private competitions

should be minimized or eliminated. Further, the Task Force finds that the purpose of maintaining organic depots is to (1) provide minimum "CORE" maintenance and repair capability necessary to support the JCS contingency requirements, (2) allow the Services to be "smart buyers" of maintenance and repair services, and (3) serve as the last source of repair for older weapon systems that are still within the active inventory but that private sector companies are no longer able or willing to maintain.

The Task Force also recognizes that the historic cooperation between the Department of Defense and private sector to provide U.S. Armed Forces with technologically superior weapons and equipment has been, and continues to be, a vital foundation of National power. During the current period of downsizing and reduced military expenditures public - private competitions have sometimes served to strain the relationship.

INDUSTRY CONCERNS

The Industry concerns on cost comparability procedures are many and varied and are discussed in detail below. However, these concerns can be summarized as follows:

- (1) The government has inherent advantages that can never be overcome by procedural attempts to "level" the playing field.
- (2) The private sector remains uncomfortable with any arrangement that requires it to compete against its primary client and customer. Further, when private industry feels the need to "protest" what they believe are unfair practices they feel constrained in doing so, because they do not wish to damage the fundamental customer - provider relationship.
- (3) The private sector continues to question whether all true costs are contained within government depot bids. Industry points to GAO studies and bid protests as evidence to support this position.
- (4) The private sector believes that the burdens imposed by government contract oversight and audits place the private sector at a substantial disadvantage.
- (5) The private sector believes that no adverse consequence occurs when government depots under bid, fail to follow FAR/DFAR provisions, or fail to comply with other requirements. Whereas private bidders can face debarment, severe penalties, and must absorb financial losses.
- (6) Industry believes that the limitations and failings of the DoD accounting systems make accurate and fair comparisons unachievable.

COST SUMMARY

The review of cost issues, competition issues, accounting systems, and the status of the level playing field revealed that the problems are both difficult and complex. However, the Task Force reviews did provide needed clarification and answers on a number of items discussed below:

- The paramount importance of divesting the current excess organic depot maintenance capacity in order to free up funds to support vital force readiness requirements overrides many other considerations.
- The public and private sectors have similar financial procedures, accounting systems, and methods for collecting and assigning expenses and costs. However, significant differences exist and comparison techniques acceptable to all parties may not be achievable.
- The available data does not conclusively demonstrate that either the public or private sector is inherently less expensive.
- Although public depots (like the private sector) utilize job order based accounting systems, there are significant differences between the Services in the methods applied for allocating overhead costs, indirect costs, and even in tracking and allocating direct labor and material costs. The DoD accounting systems are designed to meet OMB and Congressional requirements and do not have the capability to accurately accumulate competition data. Although the Services have established supplemental procedures for tracking these costs, differences between the Services make comparisons difficult even on an interservice basis.
- In preparing competitive bids the Services do not use the DoD approved stabilized rates. Instead, the depots develop their best estimate of the actual costs that will be incurred and then add to that cost the adjustments required by the DoD Cost Comparability Handbook. Consequently, in the absence of a detailed audit, comparisons between bidders is very difficult. This has led some to believe that depots are "buying in" and not including full costs within their bids.
- The DoD Cost Comparability Handbook was a significant attempt to level the playing field for competitions. However, the results of the Task Force review indicated that the competition field is not currently level. There appears to be too great an advantage in being the incumbent depot (usually the organic depot). Being the incumbent depot is almost always a competitive advantage in contract competitions. However, because the quality of the government Statement-of-Work sections in the Requests for Proposals (RFP) are deficient, most bidders can

not properly judge the work requirements in sufficient detail to make valid competitive bids. Due to the limited time available to complete this review, and the obstacles presented by the need to protect proprietary data, only limited information on actual contracts could be obtained. However, the Task Force was able to reach general agreement that the current competition playing field is not level, and may never be satisfactory to all parties.

The constrained budgets of this post-Cold War period has led to large backlogs of unfunded maintenance requirements which directly impact on readiness. This has led all the Services to place a high value on the role of cost. As noted above, the Task Force believes that the paramount challenge is to down size to only CORE required capacity so the organic depots are not burdened with the high cost of maintaining excess capacity. Both the Army and Navy have fully adopted this policy.

The Air Force, however, has taken the position that downsizing and reductions in excess capacity are not inconsistent with minimizing cost through competition, and that competitive advantage (the ability to offer a product at a lower cost or provide better quality), and "best value" to DoD should determine the disposition of workload. Air Force contends that its experience with competition during fiscal years 1991 - 1993 substantiates the important benefits competition can produce. The Air Force cites savings of over \$353.7 million (as compared to the original Air Force cost projections to complete the work) as a result of competitions. These savings are then available to finance other Force readiness requirements.

The Air Force agrees with the policy that depot maintenance CORE is DoD-CORE and not Service specific, and that downsizing should be accomplished while minimizing cost by interservicing workloads to the most cost efficient depot regardless of owner's Service. Air Force believes the benefits of competition, and the limited budget resources that will be available in the future, will make such an analysis both practical and necessary. Further, Air Force contends that rather than dropping public-private and public-public competitions DoD and industry should jointly develop whatever additional steps are necessary to address perceived deficiencies in the level playing field.

The Task Force agrees with the Air Force concerns regarding the importance of cost and the impact of constrained budgets on readiness. However, the Task Force believes that down sizing to CORE should be based on Service identified requirements, and not left to the uncertainties of competitions. Additionally, although the Air Force cites cost avoidance savings as the basis for supporting increased competition the uncertainty of the cost data, the limited experience DoD has had with competitions, and the problems inherent in these competitions has led the Task Force to conclude that the Air Force position is not supportable.

FINDINGS AND RECOMMENDATIONS

- The majority of the Task Force believes that public - private depot maintenance workload competitions should be eliminated or minimized. Further, it may not be possible to ever obtain agreement that government steps to "level the playing field" are sufficient or satisfactory to all parties.
- However, the Air Force takes the position that it is not acceptable to end public-private competitions, and recommends that further joint efforts be done to relieve concerns about the playing field.

MANNER

This is defined as the production, and production support processes followed to accomplish the work, production standards or work specifications followed or utilized, schedule requirements, technology employed, facilities and personnel utilized, or subcontractors used to accomplish the work.

Depot maintenance are those material maintenance functions requiring overhaul or a complete rebuilding of parts, assemblies, subassemblies, and end items (e.g., aircraft, engines, vehicles, ships, missiles), including the manufacture of parts, modifications, testing and reclamation, calibration, software maintenance, and all related supporting industrial processes. Depot maintenance processes and functions return items to a specified state or condition, as prescribed by engineered standards and specifications, to meet user or customer requirements. Depot maintenance is usually the most capable level of maintenance when multiple levels are established, such as organizational or unit maintenance, intermediate maintenance, and finally depot level maintenance.

WORK SPECIFICATIONS AND REQUIREMENTS

Organic Public Depots

Under the DoD Weapon Systems Reliability programs that have been in use for many years, the following typical pattern is followed in organic depots:

- At the time of acquisition the Service purchases along with the weapon system or platform, a substantial technical data package. These packages are used for many purposes and include manuals, drawings, parts lists, and initial maintenance standards developed by the original equipment manufacturer. These standards include a description of the maintenance tasks to be performed, replacements parts estimated to be required based on engineered failure rate

estimates, and the maintenance task frequencies needed to ensure predictable weapon system reliability.

- Usually, the OEM maintains the weapon system for several years before the item is transitioned into an organic depot. During this period, and following the organic depot beginning to support the item, a historic data base is generated.
- Using the data from the historical data base, and data and information obtained through formal system reliability enhancement programs (which include analysis of failure records), the original maintenance standards are updated.
- Process and material standards are also developed, as are quality assurance and control sampling methods and techniques. In some instances, industrial engineering standards are developed using methods and standards time and motion studies, work flow analysis, and other procedures.

Consequently, the work specifications and requirements and related processes are developed based on the engineering recommendations from the original manufacturer, and evolve from a combination of historical data records and formal product improvement efforts. The results of this process become the standard methods used in the organic depots.

The same data and information then becomes the basis of the Military Specifications, handbooks, procedures, and Military Standards that become required aspects of the Statement of Work in the depot competitions.

Private Industry

When the IFB or RFPs are issued the technical data, Military Specifications (MilSpecs), and related Work requirements discussed above are made available to bidders. Further, winning bidders are provided not only with data, but also in some cases with certain industrial plant equipment, technical drawings, government provided materials or components, and other items.

PRODUCTION PROCESSES

Production

The production and production support processes employed to accomplish the work required under Department of Defense maintenance competitions are essentially the same for both the public and private sector. Production work specifications to be followed or utilized (military standards or military specifications) and schedule

requirements are specified in the Invitation for Bids, or Request for Proposals, and apply equally to both the public and private bidders.

Basic processes are fundamentally the same, with the most significant differences being attributed to the commodity itself such as whether the nature of the work is more labor intensive like shipyard overhauls, or whether the work requires more replacement parts such as aircraft overhauls.

The second major difference is how the supplier (depot performing the work) is organized. The depot can be set up as an integrated industrial complex, such as most of the DoD depots and the larger private shipyards, or the depot can use an array of subcontractors for parts of the work or special processes (metal plating, painting, etc.) as is often the case in the private sector.

The fundamental work done is the same, and often is accomplished in almost an identical manner. As a typical example this would include:

- initial inspection
- disassembly and nondestructive tests
- component or parts repair or replacement
- frame or basic structural repair or buildup
- reassembly and installation
- test and evaluation
- painting, or other final preparation
- final test, inspection, and acceptance
- packaging, shipping

Whether portions of these processes are done by subcontractors or done in co-located support shops does not change the basic nature of the work.

FACILITIES AND TECHNOLOGY

Within the basic work processes discussed above varying production work flow techniques and technology can be employed. Examples of this would be:

- A flowing production line where a major end item (such as a tank or plane) moves along the "line" from shop to shop in a flow process. This is the typical new manufacturing production line approach.
- In other circumstances the item itself is stationary and work crews, equipment, and materials are brought, in stages or phases, to the item which stays located in a production "stall".

The use of either of these two techniques is primarily determined by the commodity or item being repaired. Examples of each type can be found in industry or government depots. In a similar way, the item being worked directly impacts the minimum facilities employed such as drydocks for ships and hangers for aircraft. Again, no significant or fundamental differences could be attributed to the public or private sector for items of this type.

However, the technology employed in performing production and production support processes can differ significantly. As examples, higher levels of technology can be used in testing processes, automated (numerically controlled or computer driven) industrial plant equipment can reduce labor hours or reduce wasted materials (more precision cutting or bending resulting in less waste), large cranes or other automated material handling equipment can move equipment or parts more rapidly than manual methods.

The time constraints imposed by the reporting deadlines for this study, and concern over proprietary data and industrial trade secrets, preventing a comprehensive analysis of technology issues. However, it is our general belief that major differences do not exist, in general, between the public and private sector in this area.

All public depots and all private depot organizations we are familiar with, all have established, long-standing internal productivity enhancement programs. A common part of such programs is the purchase of new, improved, or higher level technology and equipment. The manufacturers of these items sponsor trade shows and market their new items to both public and private customers. Further, as current equipment wears out or must be replaced the new technology replaces the old.

A review and comparison of ratios of capital investments to total operational sales between the sectors provides some indication of the level of technology employed.

Although data from all public depots is available, only data from selected portions of the private aerospace industry was available for comparison. That limited sample reflects:

- Greater levels of expenditures in the late 1980s by private depots.
- Higher rates of expenditures during the early 1990s by public depots.
- The differences were usually less than 1 percent between the sectors (aerospace only).

The apparent trend is that when a new weapon system is developed (for new manufacturing in the private sector), or brought in for maintenance for the first time (in the case of the public depots) a substantial initial investment in equipment and

technology occurs in either sector. Since new starts are now rare in both sectors capital investments are similar and primarily tied to maintenance of their respective industrial bases.

ORGANIZATION

As stated above, the most significant difference between the manner in which depot maintenance is performed between the public and private depot systems is in the basic organization of the providers.

Government depots are usually multiple commodity, integrated, complex industrial centers with a wide range of both basic and support shops. Some of the private sector companies are set up in a similar fashion such as the private shipyards, and major prime contractors. However, many private firms including many OEMs utilize a large number of subcontractors to perform parts of the work. Which of these two organization types is more efficient is best judged by other criteria, such as cost, quality, and schedule performance.

QUALITY

As part of the effort to evaluate performance of the depot-level maintenance workload by employees of the Department of Defense and by non-federal Government personnel issues relating to quality were reviewed.

Quality as defined here means the degree of excellence. It is one of the three parameters present when performing depot maintenance work, the others being Cost (how much?) and Schedule (how long?). The degree of excellence is a prerequisite condition of the work (as articulated by the acquisition authority through technical requirements, specifications, and standards). Thus, quality is fundamentally constant by definition. Cost and Schedule will vary in an effort to achieve Quality - the preselected degree of excellence resident in the work requirements.

General Finding

In the process of performing the evaluation there was no *prima facie* evidence uncovered which would indicate that a quality problem existed either in the public depots or with industry. In general, the competence and qualifications needed to achieve the stated work requirements exist in both sectors.

Our analysis found nothing which would dissuade us from these conclusions. In both industry and the public depots Quality Assurance programs were, by and

large, sound and responsive to the requirements of the work. We reviewed two areas in order to compare quality performance in the respective sectors.

Quality Standards

Industry must perform under provisions of the Federal Acquisition Regulation (FAR) part 46, and Defense FAR Supplement (DFARS) part 246, "Quality Assurance." For complex, critical, military federal acquisitions they must comply with higher level contract quality requirements which generally require an inspection system (MIL-I-45208) and/or a quality program (MIL-Q-9858A), or a combination of these.

Each of the Service responses state that either by direct application, or application of equivalent instruction, the specifications by which they comply are similar to the aforementioned required by the government of industry. Service excerpts follow:

ARMY. Quality system standards used when performing depot work - MIL-Q-9858A (Quality Program Requirements), MIL-I-45208A (Inspection System Requirements). DESCOM-R 702=1 (Product Assurance Program Implements the requirements of MIL-Q-9858A and MIL-I-45208A).

AIR FORCE. The standards in use for the organic quality program include Air Force and AFMC directives as well as selected military standards and specifications. The primary directives are AFMCR 66-18, "Production Acceptance Certification" and AFMCR 74-2, "Organic Depot Maintenance Quality." The Air Logistic Centers (ALCs) were not required to specifically use MIL-Q-9858A (Quality Program Requirements) in the past for work done organically. As part of the Depot Maintenance Competition (DMC) effort, however, all competed workloads must normally comply with the requirements of the Request for Proposal (Generally higher level quality requirements of MIL-Q-9858A/MIL-I-45208). As a result, in April 1993, ALCs were directed to prepare Quality Program Plans (QPPs) to meet MIL-Q-9858A requirements for DMC workloads. The intent is to have both organic and competed workloads use the portions of the QPP that apply.

MARINE CORPS. The Quality Assurance Program is implemented at the Command level by Base Order P4855.8, Quality Assurance Program.

The Multi-Commodity Maintenance Centers have developed a Quality Assurance Program documented through a series of Standard Operating Procedures (SOPs). The span of control documented in the sum total of the SOPs provides the near equivalent of MIL-Q-9858A that may be invoked upon a private sector contractor. The Multi-Commodity Maintenance Centers have already been audited and accepted as MIL-I-45208 plants by their customers.

NAVAIR. NADEP Quality Program requirements are delineated in both MIL-Q-9858A and OPNAVINST 4790.2E, Volume IV, Chapter 4. A comparison chart provides a cross reference of same.

NAVSEA. The top quality standard is the "Naval Shipyard Quality Program Manual," NAVSEA TL855-AA-STD-010 dated March 21, 1988. This document essentially is a tailored MIL-STD 9858A "Quality Program Requirements."

INTERNAL QUALITY CONTROL

Both public and private depots are required to maintain internal quality control programs. These programs range in both size and complexity, and vary by commodity types as much as they do between public and private sectors. However, most include internal inspectors, programs for ensuring the knowledge, skills, and abilities of the craftsmen performing the work (employee certification programs, training programs, apprentice programs, and others), formal product testing, inspecting, and random sampling programs (of varying degrees). Additionally, private industry providers have formal programs for monitoring the work of subcontractors, to ensure the work subcontractors perform also conforms to the Prime Contractors requirements. Further, warranty programs were observed in both public and private depots.

EXTERNAL QUALITY CONTROL

The largest difference between the sectors is in the area of external quality control. When the private sector performs work for the government the contractor maintains a quality control program, and the government (in DoD's case usually Defense Contract Management Command inspectors) performs quality assurance surveillance. The equivalent to this within public depots is when the GAO, and/or Service or DoD Inspector General organizations conduct audits and studies, and higher commands perform inspections of the depot quality program.

FUTURE TRENDS

Several of the public depot systems (the NADEPS, Marine Corps, and Air Force Depots) have embarked on a program to create an atmosphere similar to that which occurs at private plants where customer representatives are present on site to approve changes and monitor quality. Beginning this year DCMC personnel will perform the same services at some Navy depots as they now perform in the private sector. The Army is also working on new methods of improving quality control and ensuring the customer's interests are protected. Should these trends continue the differences between the sectors will further reduce.

Quality Deficiency Reporting System (QDRS)

During this review the Task Force attempted to obtain actual data on quality defect reports (QDRs) reported under the DoD Quality Deficiency Reporting System. However, the Military Services were unable to provide this data so no direct analysis was possible.

DEPOT MAINTENANCE CUSTOMER ORDERS

18 March 1994

SERVICE	FY90	FY91	FY92	FY93	FY94	TOTAL
ARMY						
DBOF DEPOTS	1,366.10	1,391.70	1,550.40	1,338.70	1,264.40	6,911.30
NATIONAL MTN	708.00	932.00	760.00	578.00	605.00	3,583.00
CONTRACTS						
MODS & UPGRADES	121.70	281.90	148.30	95.40	173.00	820.30
MAN KITS						
R&D IN	42.30	51.20	42.40	41.90	39.60	217.40
PRIVATE SECT						
CONTR PROV	108.30	146.30	177.80	154.40	136.70	723.50
LOGISTICS						
SUBTOTAL	2,346.40	2,803.10	2,678.90	2,208.40	2,218.70	12,255.50
NAVAIR						
DBOF NADEPS	1,720.00	1,799.80	1,704.40	1,799.30	1,712.30	8,735.80
PRIVATE MAINTENANCE	244.10	383.00	343.80	167.60	176.60	1,315.10
PRIVATE MODS	405.00	145.80	99.10	190.00	74.00	913.90
ICP	480.90	411.90	400.30	329.20	387.80	2,010.10
COMMERCIAL						
SUBTOTAL	2,850.00	2,740.50	2,547.60	2,486.10	2,350.70	12,974.90
NAVSEA						
DBOF SHIPYARDS	3,840.40	3,984.30	4,201.50	4,021.50	3,896.20	19,943.90
PRIVATE SHIPYARDS	1,551.00	1,666.00	1,652.00	1,304.00	1,008.00	7,181.00
OTHER NAVSEA	222.80	240.50	219.50	226.90	190.10	1,099.80
ORGANIC						
OTHER CONTRACT	165.70	168.70	156.50	162.50	142.00	795.40
SPCC	147.00	163.00	187.00	116.00	118.80	731.80
COMMERCIAL						
SUBTOTAL	5,926.90	6,222.50	6,416.50	5,830.90	5,355.10	29,751.90
MARINE CORPS						
DBOF DEPOTS	120.20	105.70	228.20	210.70	72.50	737.30
PRIVATE MTN	0.00	0.00	0.00	0.00	0.00	0.00
CONTRACTS						
COMMERCIAL KIT	3.90	6.60	5.20	2.00	0.90	18.60
MANUFACTURE						
RDT&E MODS	18.30	24.40	21.70	19.50	11.30	95.20
COMMERCIAL CONTRACT						
PROV	9.30	12.30	18.30	9.00	1.20	50.10
LOGISTICS						
SUBTOTAL	151.70	149.00	273.40	241.20	85.90	901.20

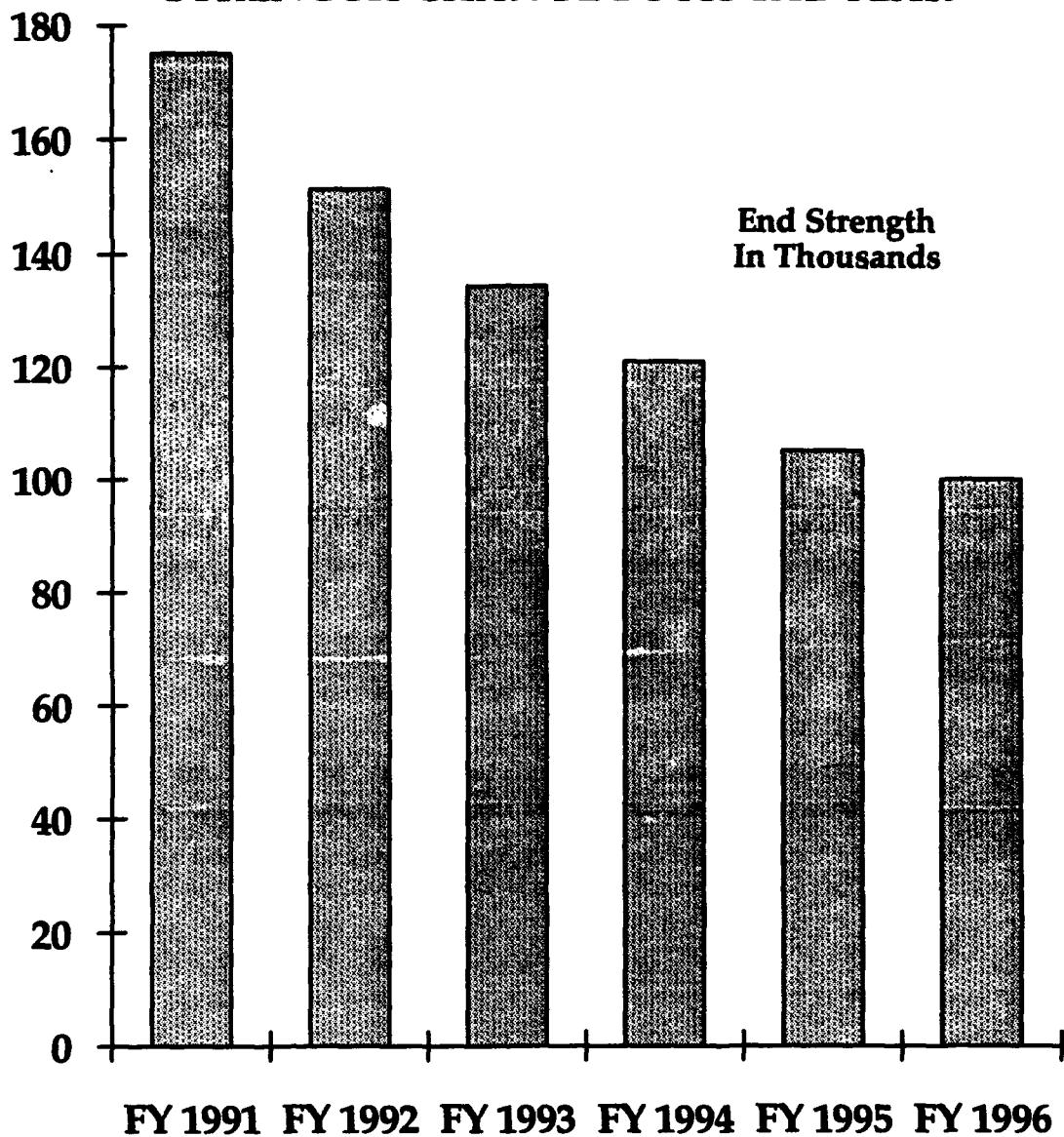
SERVICE	FY90	FY91	FY92	FY93	FY94	TOTAL	
AIR FORCE							
DBOF DEPOTS	2,331.90	2,446.70	2,553.20	2,978.50	3,142.20	13,452.50	71.2%
PRIVATE MTN CONTRACTS	850.90	781.10	779.20	394.10	400.90	3,206.20	17.0%
PROCUREMENT COMMERCIAL	37.40	85.50	225.90	102.20	54.00	505.00	2.7%
RDT&E MODS COMMERCIAL	26.00	35.00	14.80	2.40	6.60	84.80	0.4%
ICP COMMERCIAL	344.60	231.50	426.30	310.20	338.00	1,650.60	8.7%
SUBTOTAL	3,590.80	3,579.80	3,999.40	3,787.40	3,941.70	18,899.10	100.0%
DOD TOTALS							
DBOF DEPOTS	9,601.40	9,968.70	10,457.20	10,575.60	10,277.70	50,880.60	68.0%
PRIVATE MTN CONTRACTS	3,354.00	3,762.10	3,535.00	2,443.70	2,190.50	15,285.30	20.4%
PROCUREMENT COMMERCIAL	1,706.20	1,494.90	1,648.60	1,307.50	1,288.50	7,445.70	10.0%
CLS & OTHER COMMERCIAL	204.20	269.20	275.00	227.20	195.40	1,171.00	1.6%
SUBTOTAL	14,865.80	15,494.90	15,915.80	14,554.00	13,952.10	74,782.60	100.0%
TOTAL	14,865.80	15,494.90	15,915.80	14,554.00	13,952.10		

NOTES:

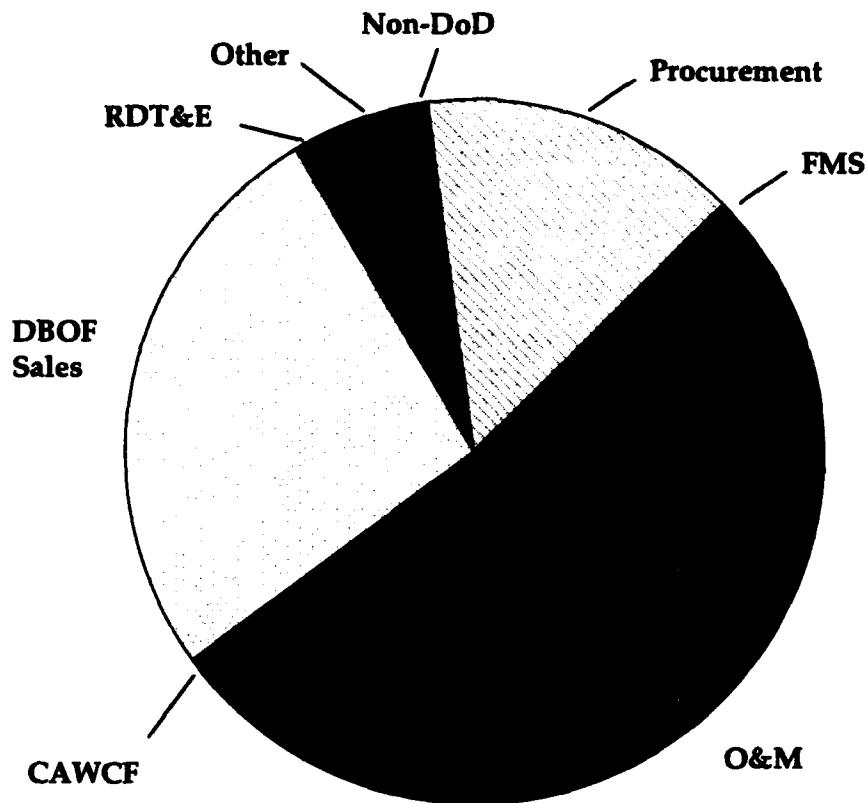
- A. In Army DESCOM Depots funding for supply, logistics support, base operations and other non-maintenance related functions has not been included.
- B. Only the depot maintenance funding for Naval Weapon Stations and Naval Warfare Centers is included in the figures listed above. The remaining funding for these businesses is not normally considered depot maintenance (either organic or commercial).
- C. Army DBOF Depot Maintenance - Ordnance funding is not included in the Army totals above.
- D. These additional DBOF funds not included above are listed below.

TOTAL FROM ABOVE	14,865.80	15,494.90	15,915.80	14,554.00	13,952.10
OTHER DESCOM	700.00	705.90	471.80	621.50	409.60
ARMY ORDNANCE	450.30	547.30	630.00	619.00	612.80
OTHER NAVAL ORDNANCE	540.60	622.20	676.60	660.10	562.20
TOTAL	16,556.70	17,370.30	17,694.20	16,454.60	15,536.70

TOTAL DEFENSE DEPOT CIVILIAN END STRENGTH CHANGE BY FISCAL YEAR



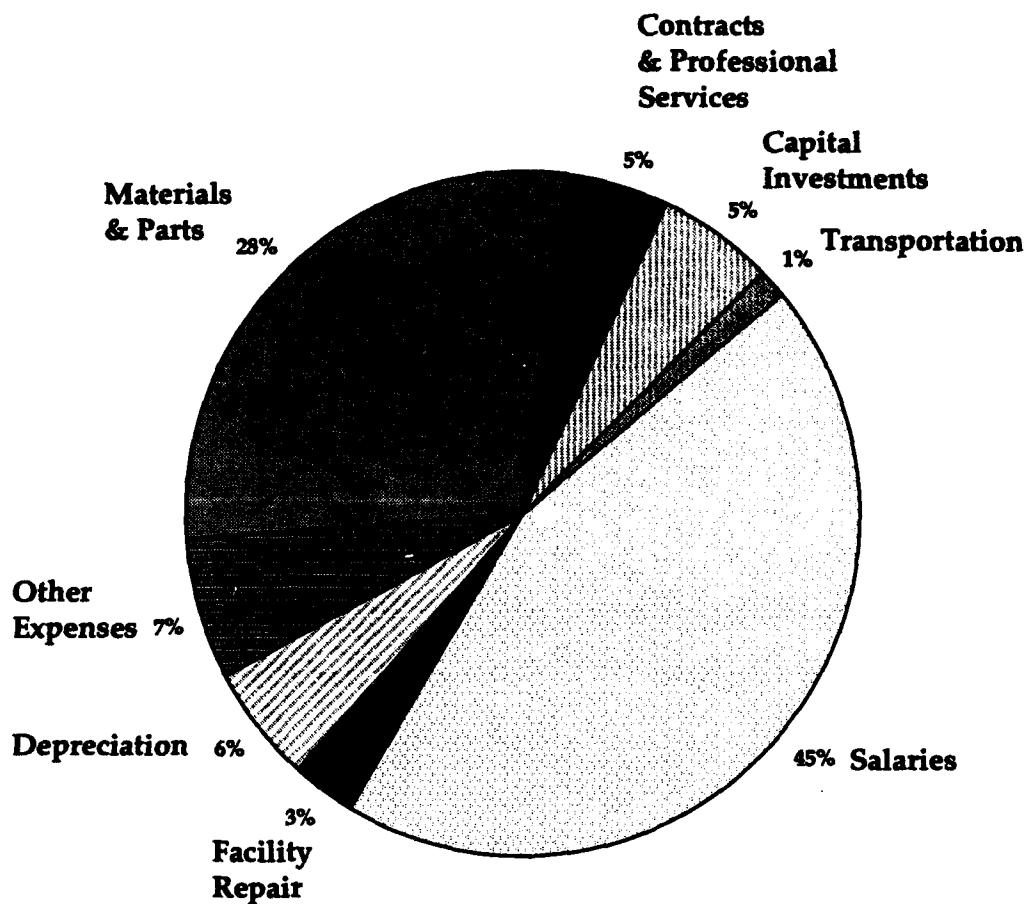
This chart reflects the change in civilian full time equivalent personnel end strength in the DoD Depot System, including actuals for FY 1991 through FY 1993, and programmed budget levels at the end of the fiscal year for FY 1994 through FY 1996. Reductions have been accomplished by attrition, transfers, and reductions-in-force, and early retirement incentives.



SOURCE OF REVENUES FOR DoD DBOF DEPOTS IN FY 1994

<u>Source of Revenues</u>	<u>(\$ in Millions)</u>	<u>%</u>
O&M Appropriations	6,474	50.4
Procurement Appropriations	1,866	14.5
DBOF Internal Sales (mostly Supply)	3,387	26.3
RDT&E Appropriations	246	1.9
Conventional Ammunitions Working Capitol Fund	93	0.7
Foreign Military Sales	188	1.5
Other Service Appropriations	494	3.9
Other DoD and non-DoD Orders	106	.8
Total FY 1994	12,855	100%

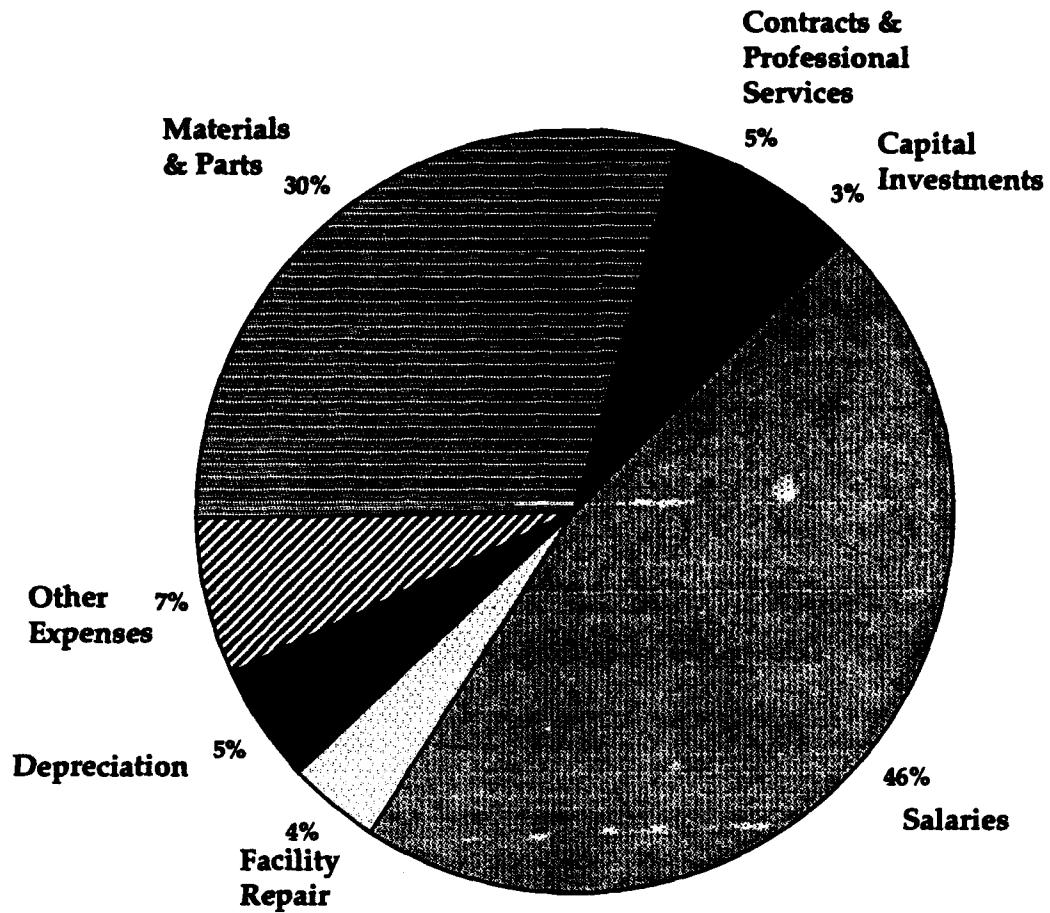
SOURCE: FY 1994 COLUMN OF THE FY 1994 PRESIDENT'S BUDGET SUBMISSION



ARMY MAINTENANCE DEPOTS FY 1993 EXPENSES

Elements of Cost for Army Maintenance Depots in FY 1993 (does not include Army Ordnance Depots). Does not include depot maintenance work directly contracted to the private sector.

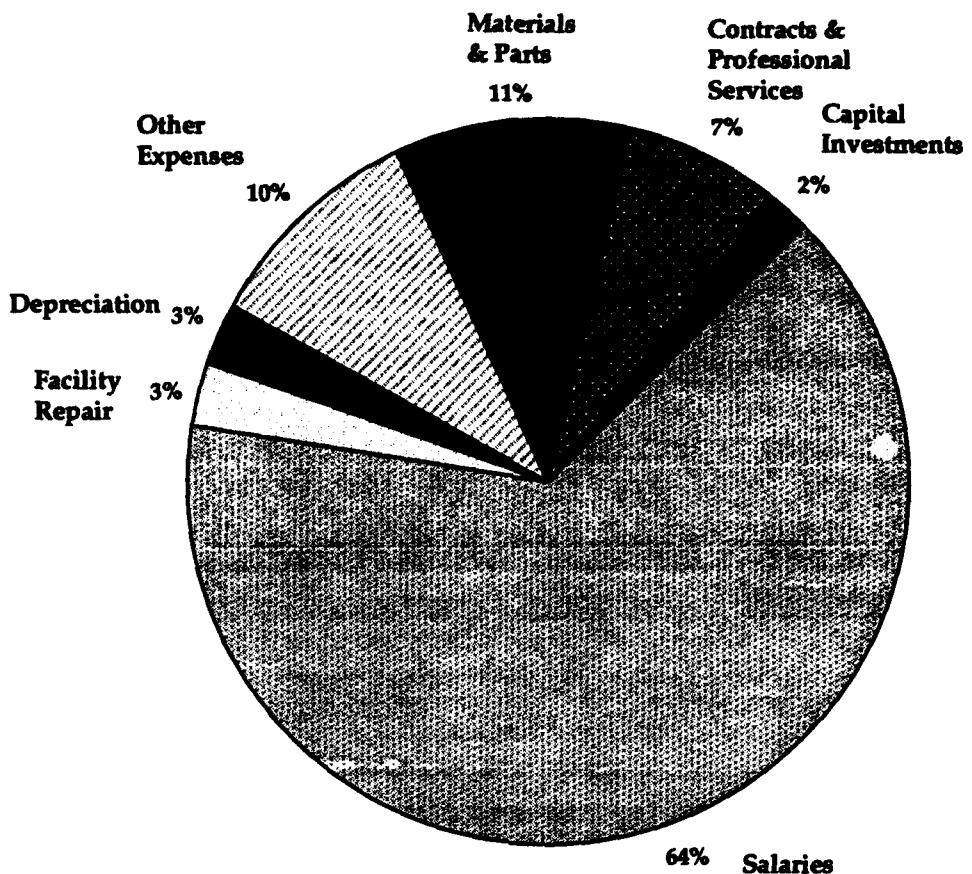
SOURCE: FY 1993 COLUMN OF THE FY 1994 PRESIDENT'S BUDGET SUBMISSION



NAVAL AVIATION DEPOTS FY 1993 EXPENSES

Elements of Cost for DBOF Naval Aviation Depots. Does not include depot maintenance work directly contracted to the private sector.

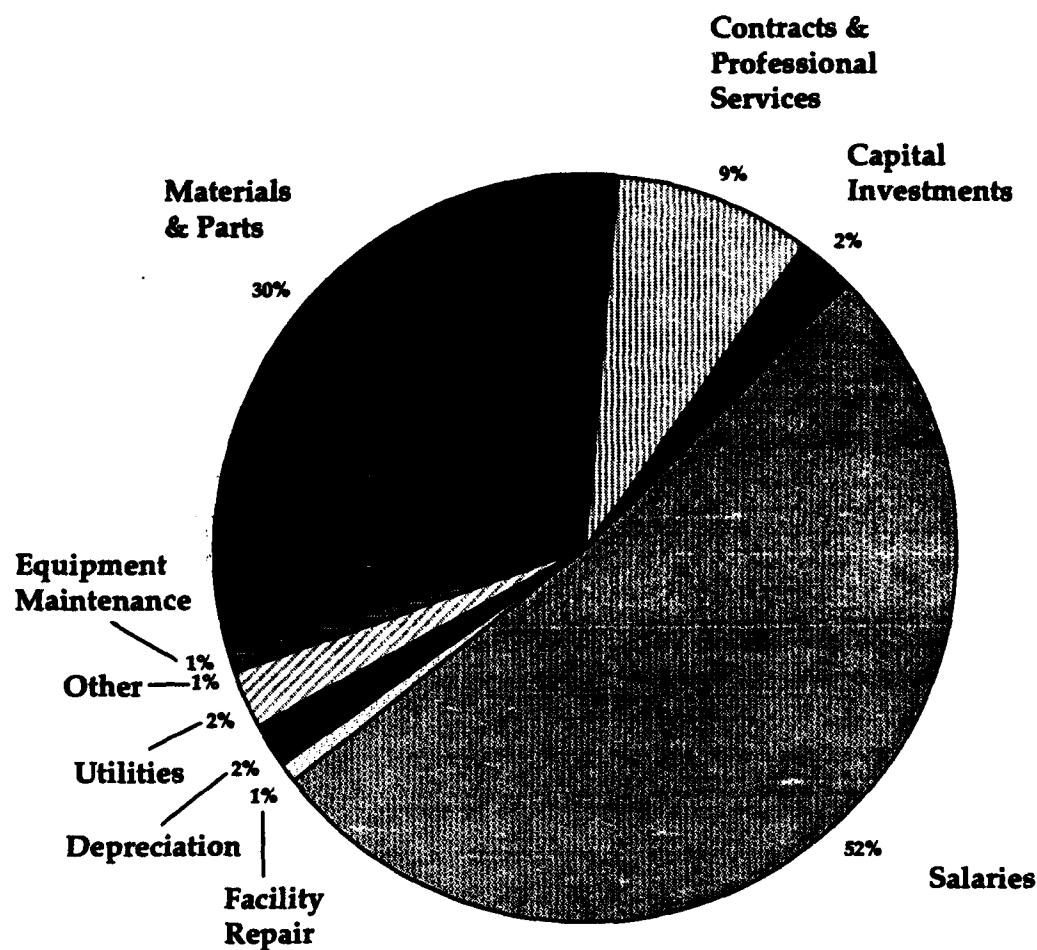
SOURCE: FY 1993 COLUMN OF THE FY 1994 PRESIDENT'S BUDGET SUBMISSION



NAVAL SHIPYARDS FY 1993 EXPENSES

Elements of Cost for DBOF Naval Shipyards. Does not include depot maintenance work directly contracted to the private sector.

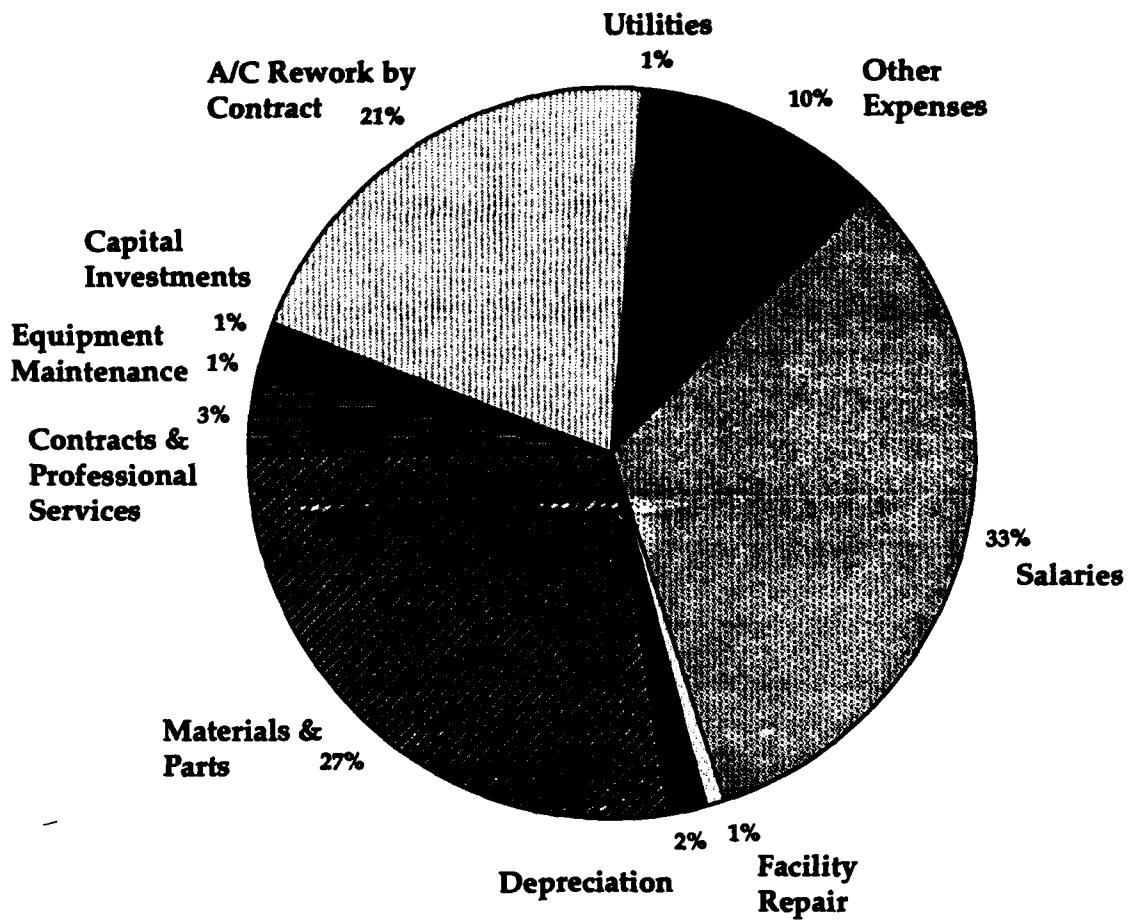
SOURCE: FY 1993 COLUMN OF THE FY 1994 PRESIDENT'S BUDGET SUBMISSION



MARINE CORPS DEPOTS FY 1993 EXPENSES

Elements of Cost for DBOF Marine Corps Depots. Does not include depot maintenance work directly contracted to the private sector.

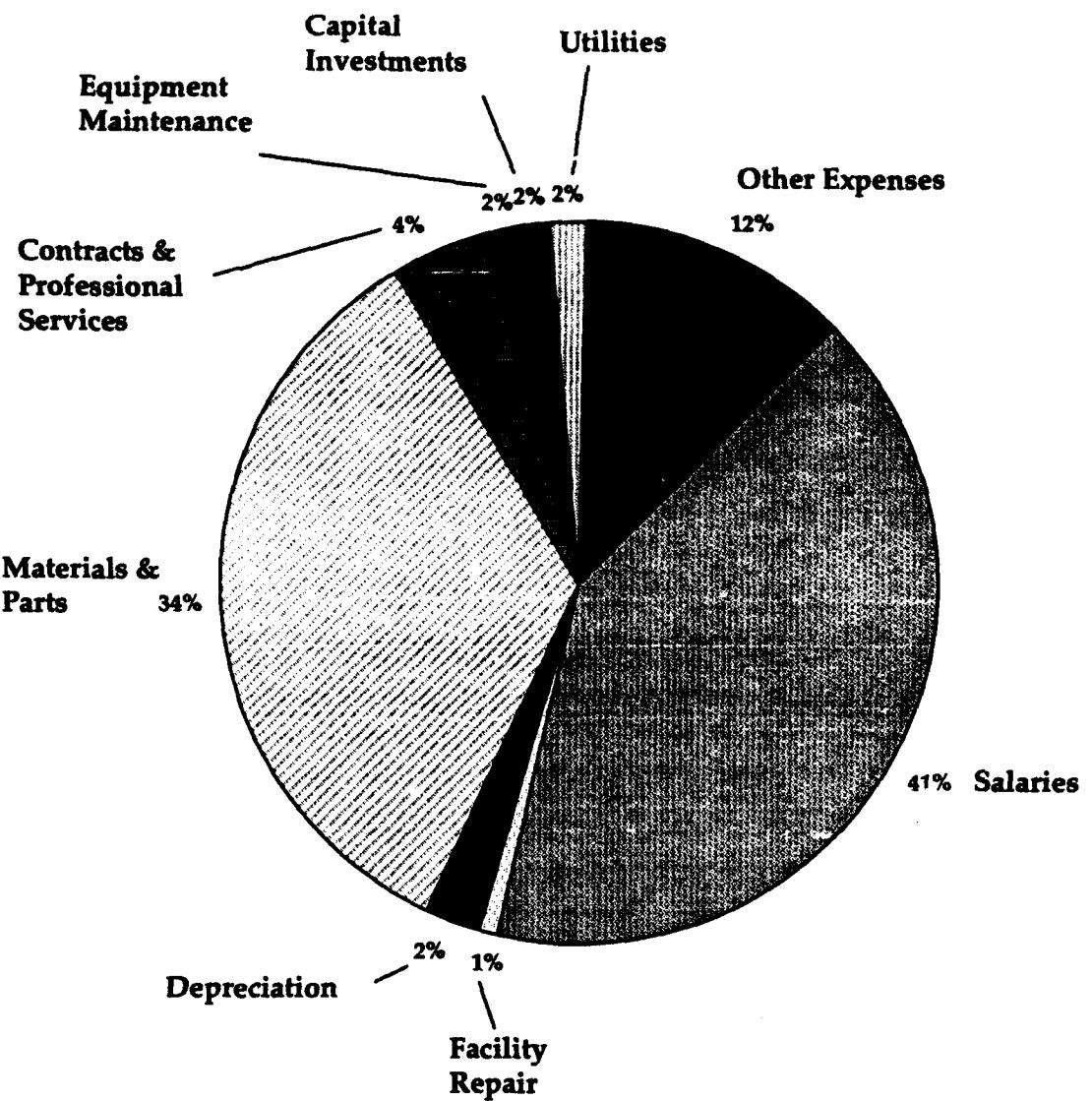
SOURCE: FY 1993 COLUMN OF THE FY 1994 PRESIDENT'S BUDGET SUBMISSION



AIR FORCE DEPOTS FY 1993 EXPENSES

Elements of Cost for DBOF Air Force Depots. Does not include depot maintenance work directly contracted to the private sector.

SOURCE: FY 1993 COLUMN OF THE FY 1994 PRESIDENT'S BUDGET SUBMISSION

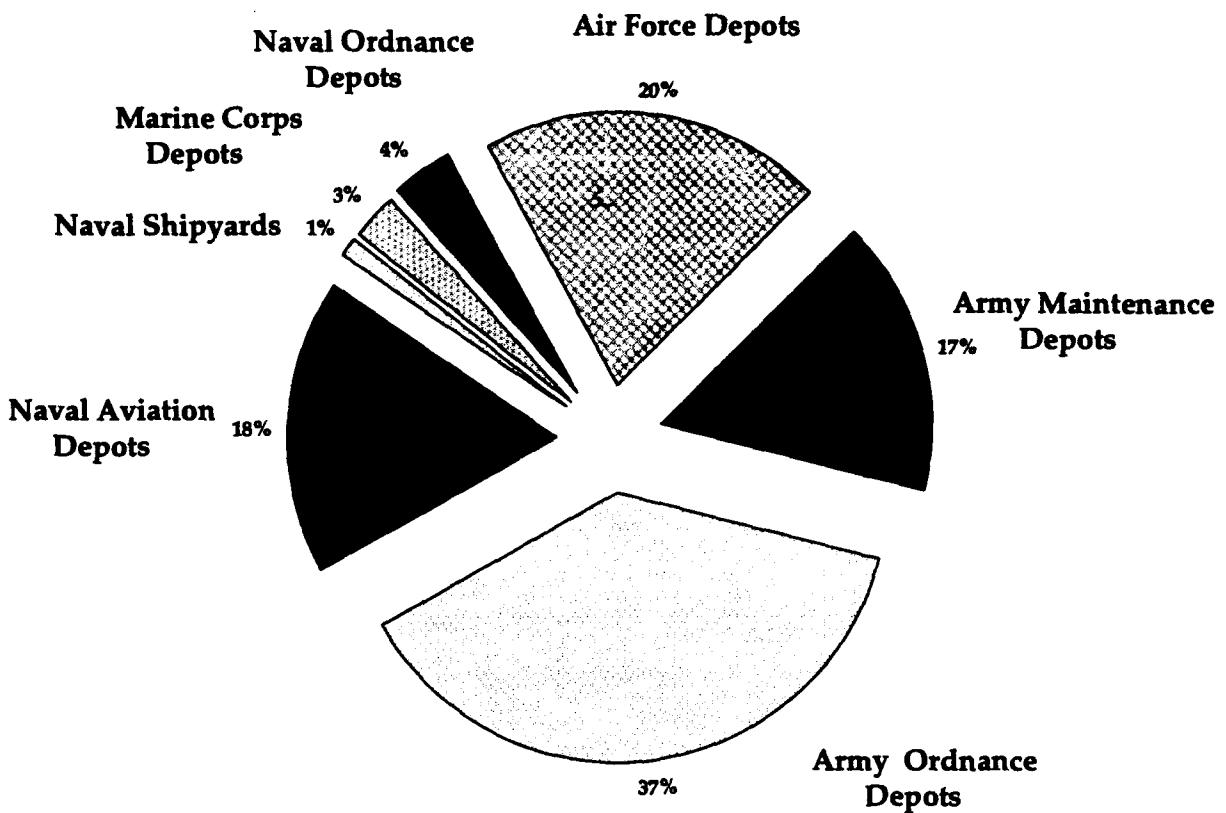


AIR FORCE DEPOTS FY 1993 EXPENSES

(Excludes A/C rework by contract)

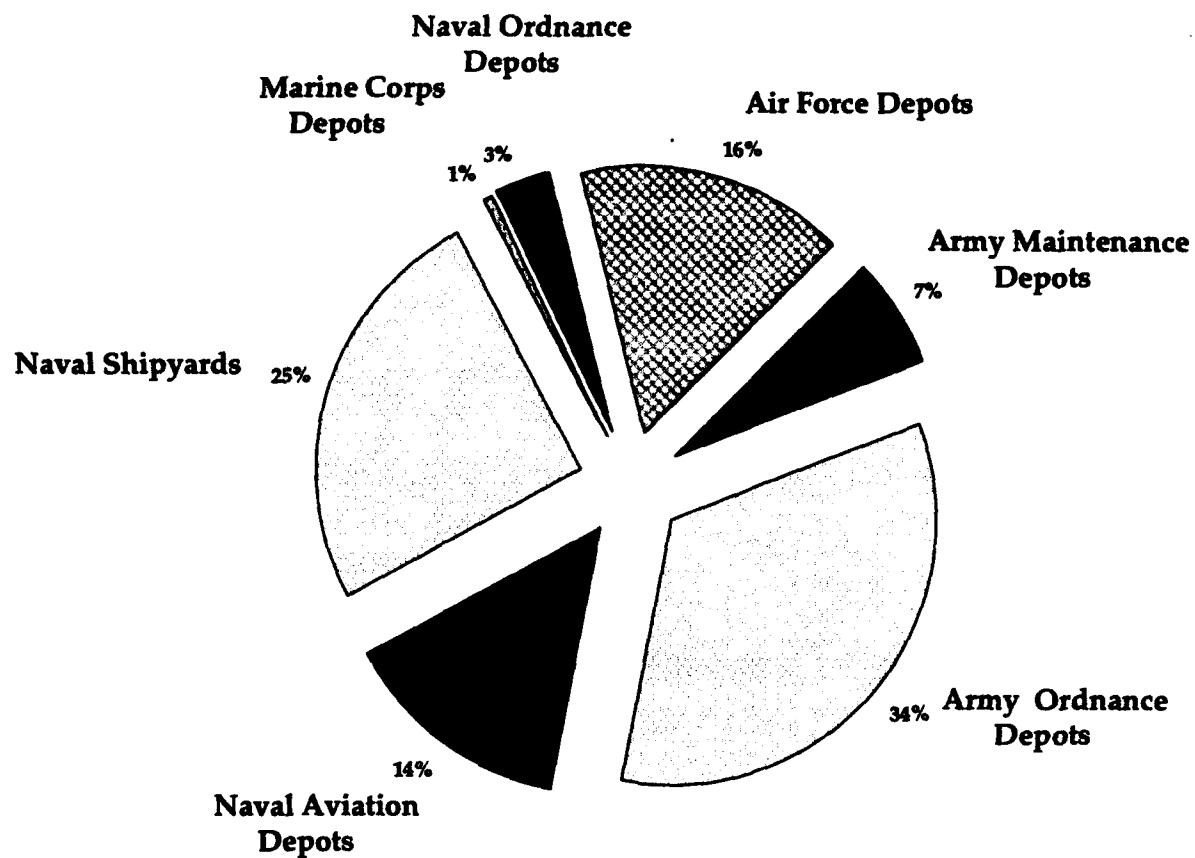
Elements of Cost for DBOF Air Force Depots. Does not include depot maintenance work directly contracted to the private sector.

SOURCE: FY 1993 COLUMN OF THE FY 1994 PRESIDENT'S BUDGET SUBMISSION



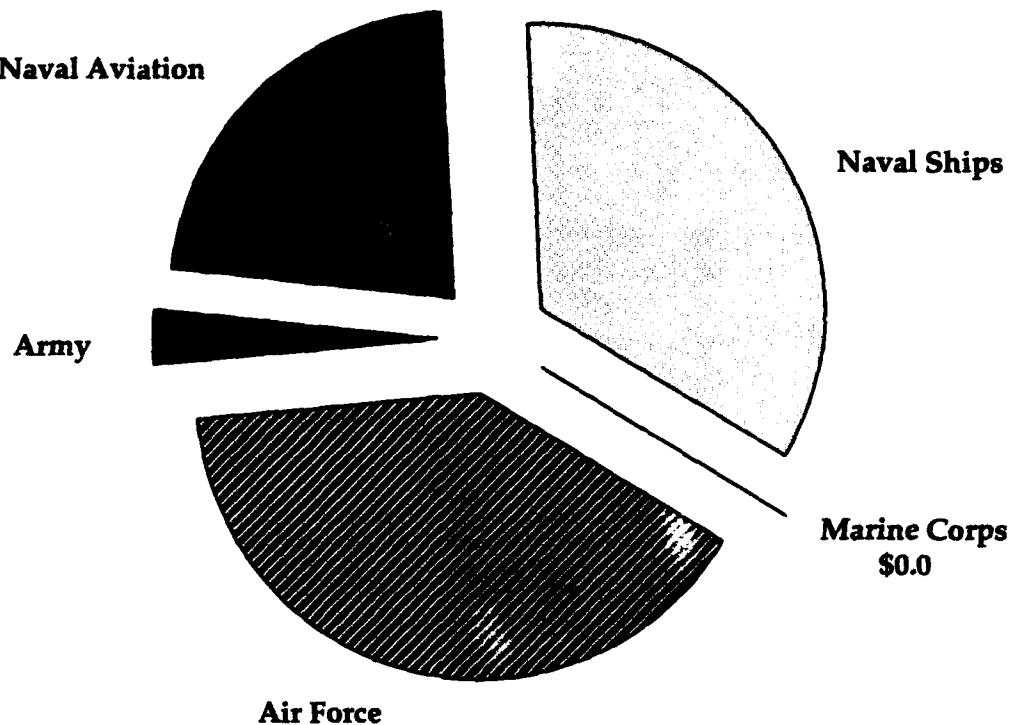
FOREIGN MILITARY SALES BY DoD DBOF DEPOTS IN FY 1993

<u>Sales Revenue</u>	<u>(\$ in Millions)</u>
Army Maintenance Depots	46.9
Army Ordnance Depots	107.6
Naval Aviation Depots	49.9
Naval Shipyards	2.9
Marine Corps Depots	8.0
Naval Ordnance Stations	10.5
Air Force Depots	<u>57.7</u>
Total FY 1993	283.5



FOREIGN MILITARY SALES BY DoD DBOF DEPOTS IN FY 1992

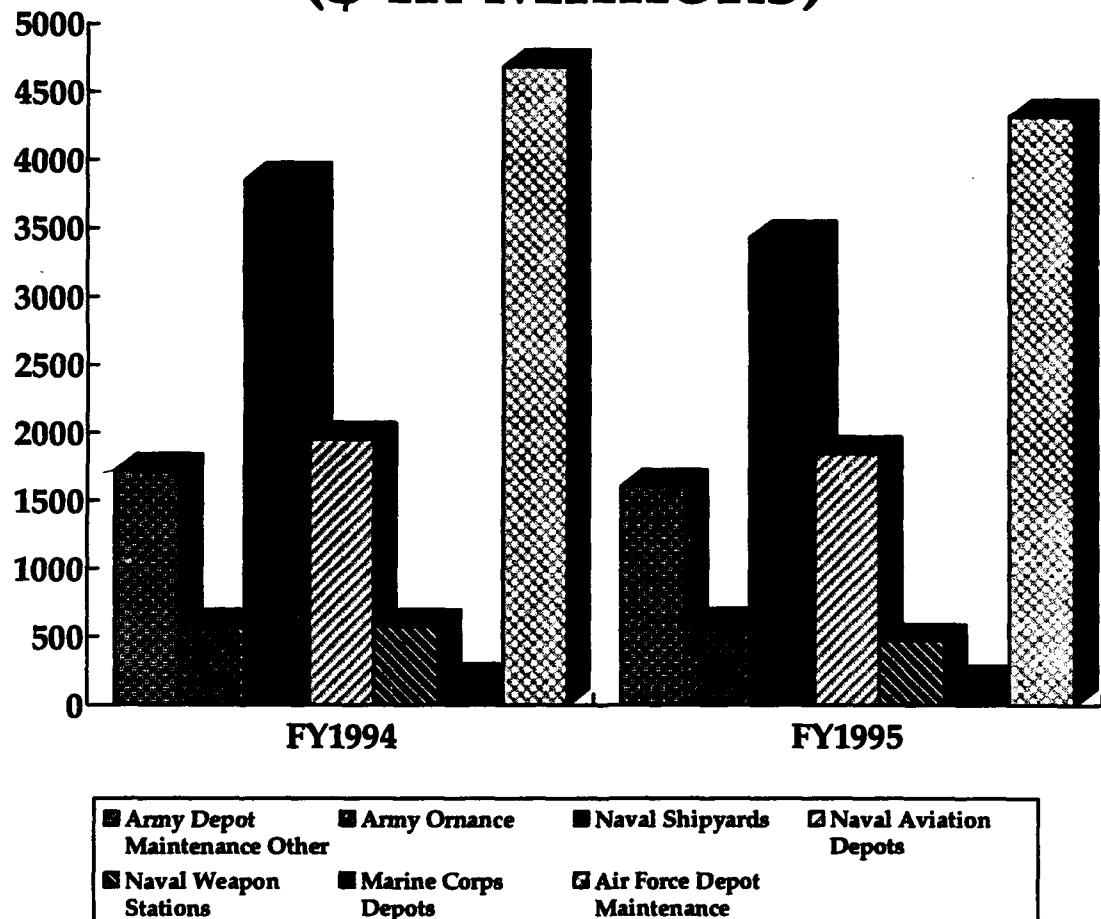
<u>Sales Revenue</u>	<u>(\$ in Millions)</u>
Army Maintenance Depots	21.0
Army Ordnance Depots	106.6
Naval Aviation Depots	44.3
Naval Shipyards	78.2
Marine Corps Depots	2.0
Naval Ordnance Stations	10.2
Air Force Depots	<u>51.0</u>
Total FY 1992	313.3



**FOREIGN OR "OFF-SHORE" DEPOT MAINTENANCE
CONTRACTS IN FISCAL YEAR 1993**

<u>Funding</u>	<u>(\$ in Millions)</u>
Army	5.0
Naval Aviation	35.0
Naval Ships	54.0
Marine Corps	0.0
Air Force	62.0
Total FY 1993:	156.0

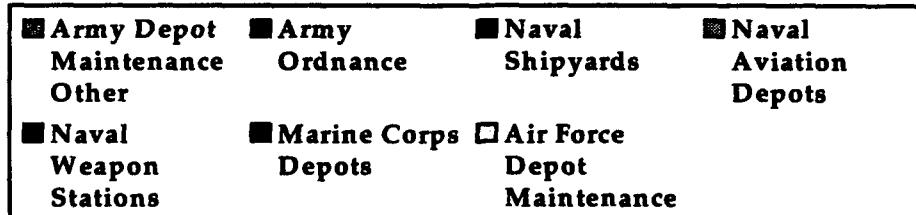
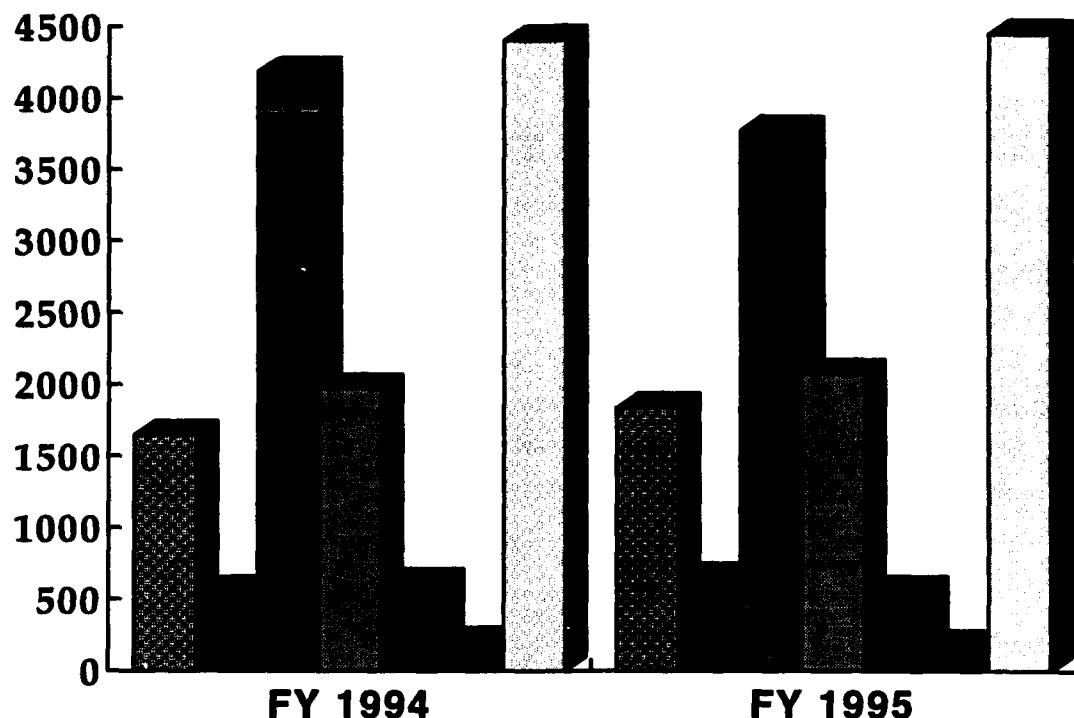
**FY 1995 BUDGET
REQUEST
Defense Business
Operations Fund
DEPOT COSTS
(\$ in Millions)**



**FY 1995 BUDGET
REQUEST
Defense Business
Operations Fund
DEPOT COSTS
(\$ in Millions)**

	FY 1994	FY 1995
ARMY DEPOT MAINTENANCE OTHER	1,721.8	1,605.5
ARMY ORDNANCE	574.0	582.9
NAVAL SHIPYARDS	3,855.8	3,430.8
NAVAL AVIATION DEPOTS	1,953.0	1,851.9
NAVAL WEAPONS STATIONS	576.0	470.3
MARINE CORPS DEPOTS	179.7	164.5
AIR FORCE DEPOT MAINTENANCE	4,684.0	4,327.2
 TOTAL	 13,544.3	 12,433.1

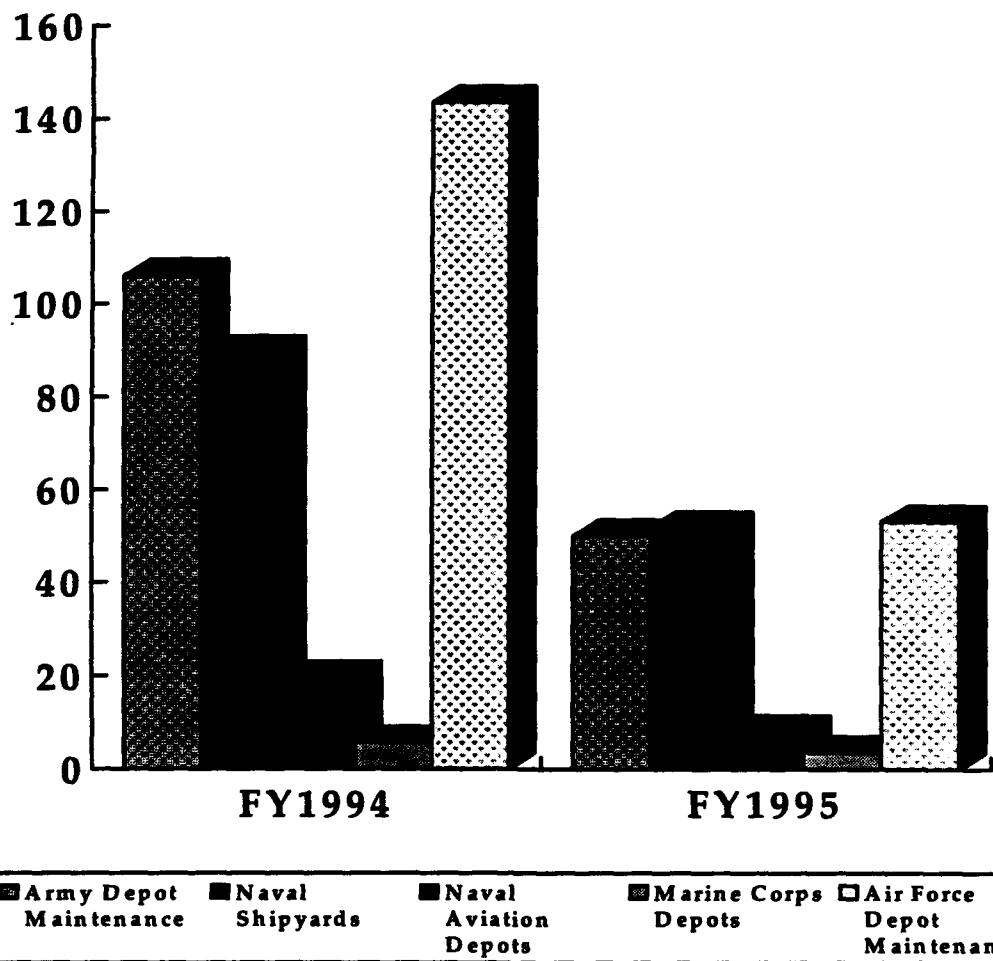
**FY 1995 BUDGET
REQUEST
Defense Business
Operations Fund
DEPOT REVENUES
(\$ in Millions)**



**FY 1995 BUDGET
REQUEST
Defense Business
Operations Fund
DEPOT REVENUES
(\$ in Millions)**

	FY 1994	FY 1995
ARMY DEPOT MAINTENANCE OTHER	1,647.8	1,838.1
ARMY ORDNANCE	559.0	651.5
NAVAL SHIPYARDS	4,184.6	3,770.2
NAVAL AVIATION DEPOTS	1,971.1	2,074.7
NAVAL WEAPONS STATIONS	608.7	559.3
MARINE CORPS DEPOTS	203.3	184.0
AIR FORCE DEPOT MAINTENANCE	4,401.4	4,448.0
 TOTAL	13,575.9	13,525.8

**FY 1995 BUDGET
REQUEST**
**Defense Business
Operations Fund**
**DEPOT CAPITAL
INVESTMENTS**
(Program \$ in Millions)



**FY 1995 BUDGET
REQUEST
Defense Business
Operations Fund
DEPOT CAPITAL
INVESTMENTS
(Program \$ in Millions)**

	FY 1994	FY 1995
ARMY DEPOT MAINTENANCE OTHER	106.2	50.2
NAVAL SHIPYARDS	89.7	52.0
NAVAL AVIATION DEPOTS	19.6	8.0
MARINE CORPS DEPOTS	5.6	3.6
AIR FORCE DEPOT MAINTENANCE	143.7	53.4
 TOTAL	 364.8	 167.2

TOTAL CAPITAL INVESTMENTS

(Dollars in Millions)

	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95
Major Construction	115	160	86	90	76	21
Air Force	55	37	17	32	43	8
Army	9	17	16	26	1	2
Marine Corps	0	4	2	4	0	0
NAVAIR	0	15	11	0	0	0
NAVSEA	51	87	40	28	32	11

TOTAL CAPITAL INVESTMENTS

(Dollars in Millions)

	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95
Minor Construction	17	19	33	23	36	19
Air Force	6	1	15	9	11	6
Army	0	4	4	8	7	3
Marine Corps	0	2	1	1	2	1
NAVAIR	5	8	3	2	4	2
NAVSEA	6	4	10	3	12	7

TOTAL CAPITAL INVESTMENTS

(Dollars in Millions)

	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95
ADPE	14	20	34	20	67	28
Air Force	4	3	9	2	42	1
Army	0	4	8	0	0	0
Marine Corps	0	0	0	0	0	0
NAVAIR	1	0	0	0	6	5
NAVSEA	9	13	17	18	19	22

TOTAL CAPITAL INVESTMENTS

(Dollars in Millions)

	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95
Software	30	15	13	8	42	6
Air Force	30	15	12	8	41	6
Army	0	0	0	0	0	0
Marine Corps	0	0	0	0	0	0
NAVAIR	0	0	1	0	0	0
NAVSEA	0	0	0	0	1	0

TOTAL CAPITAL INVESTMENTS

(Dollars in Millions)

Equipment	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95
Air Force	185	152	179	148	216	134
Army	22	36	53	42	91	46
Marine Corps	77	42	58	53	65	43
NAVAIR	2	4	2	2	2	2
NAVSEA	31	35	16	7	14	10
	53	35	50	44	44	33

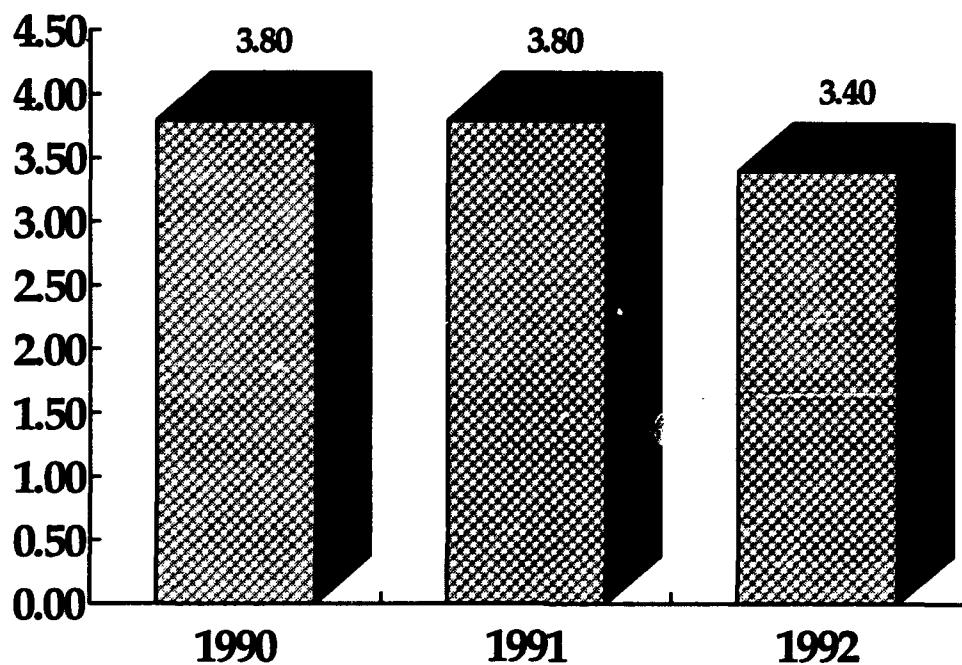
TOTAL CAPITAL INVESTMENTS

(Dollars in Millions)

	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95
Environment	6.4	4.2	17.4	15.2	47.4	7.1
Air Force	5.2	1.4	10.3	6.2	35.3	3
Army	0	0	3.8	4.7	2.8	0.9
Marine Corps	0.8	0.2	0.1	1.3	1.2	0.1
NAVAIR	.7	14.7	9.4	4.7	3.5	.4
NAVSEA	0.4	2.6	3.2	3	8.1	3.1

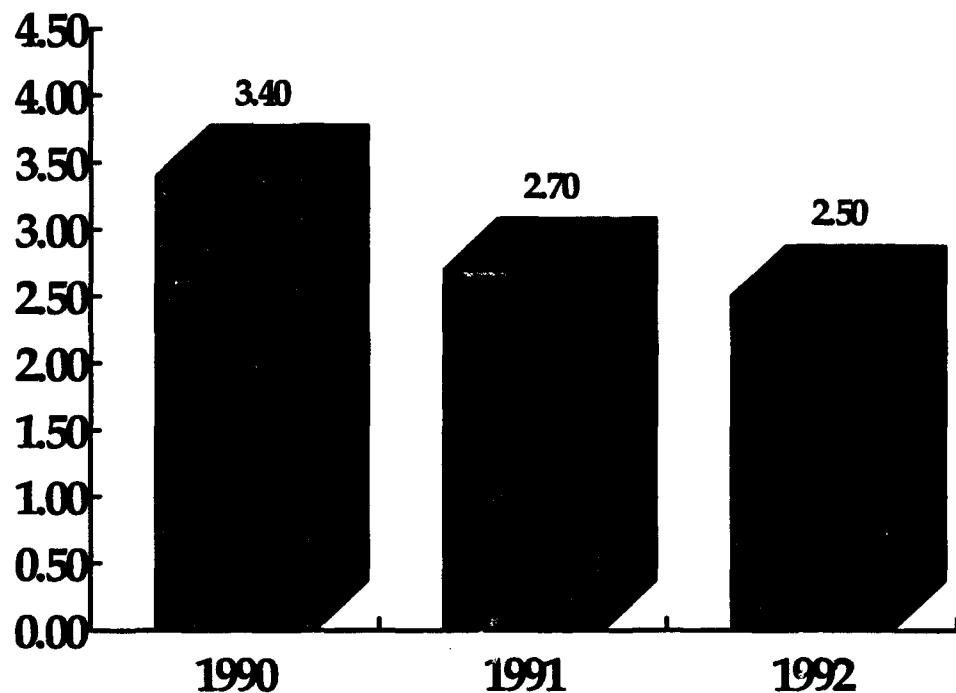
*Embedded in Equipment values on previous chart

PUBLIC CAPITAL SPENDING **AS A % OF SALES**



ARMY	6.3	4.8	5.5	6.5	5.8
NAVAIR	2.2	3.2	1.8	0.5	1.4
NAVSEA	3.1	3.5	2.8	2.3	2.8
MARINE	1.7	9.4	2.2	3.3	5.5
AIR FORCE	5	3.8	4.2	3.1	7.3
<i>TOTAL</i>	3.8	3.8	3.4	2.8	4.3

INDUSTRY CAPITAL SPENDING AS A % OF SALES



**1992 DEFENSE/AEROSPACE INDUSTRY UPDATE
INDUSTRY FINANCIAL TRENDS**

	CAPITAL SPENDING						RANKING			
	AS A % OF SALES									
COMPANY	1988	1989	1990	1991	1992	1988	1989	1990	1991	1992
—	(%)	(%)	(%)	(%)	(%)	-	-	-	-	-
General Dynamics	5.6	3.8	3.1	0.6	0.3	20	15	10	1	1
Grumman	3.1	1.7	1.2	1.3	1.1	2	1	1	4	2
Teledyne	2.1	1.9	1.3	1.3	1.5	1	2	2	3	3
Northrop	4.2	3.4	2.2	1.5	1.6	15	7	3	3	4
Westinghouse	3.8	3.7	2.3	2	1.7	9	14	6	7	5
General Electric	3.7	3.2	2.6	2.2	1.8	7	3	8	9	6
McDonnel Douglas	3.9	3.6	2.2	1.1	1.8	12	12	5	2	7
FMC Corp	3.4	4	3.6	2.1	1.8	4	16	15	8	8
Hughes	6	4.5	3.8	2.8	1.8	23	21	16	14	9
ITT	3.7	3.4	2.2	2.4	2	8	5	4	10	10
Martin Marietta	4.8	3.7	3.3	2.6	2.2	17	13	11	13	11
Raytheon	5.3	4.4	3.9	2.9	2.5	19	20	19	16	12
Litton	4.2	3.4	2.5	2.5	2.5	14	8	7	12	13
Textron	3.3	3.5	2.6	1.9	2.6	3	9	9	6	14
Harris	3.9	3.6	3.4	2.8	2.7	11	11	12	15	15
Loral	3.9	3.4	4.8	4.4	2.8	13	6	22	22	16
Rockwell	4.3	4.3	3.8	3.4	3	16	19	17	19	17
Lockheed	3.5	4	3.4	3.2	3.2	6	17	13	17	18
Allied	3.4	3.2	4.3	4.1	3.3	5	4	21	21	19
TRW	5.8	4.8	3.5	3.6	3.5	21	22	14	20	20
Texas Inst	9.1	7.1	5.5	3.4	3.7	24	23	23	18	21
Boeing	5.9	12.2	8.5	5.4	3.9	22	24	24	24	22
United Tech	4.9	4.1	4.3	4.7	3.9	18	18	20	23	23
E Systems	3.8	3.6	3.8	2.5	4.3	10	10	18	11	24
AVERAGE:	4.40	4.10	3.42	2.70	2.48					

NOTES ON CAPITAL SPENDING

Since industry covered 88-92 and the public depots covered 90-94, only 90-92 were comparable years. Therefore, the bar charts only reflect those three years.

On the spread sheet for the public sector, 94 shows a significant increase. However, if environmental expenses are removed, the figure drops from 4.3% to 3.7%. Furthermore, a substantial investment in ADPE/software to modernize the depot management systems is included in 94. If this value is also excluded, the percent drops to 2.9%.

Specifics on categories of capital investments for private industry were unavailable. The Public sector categorized their information by major construction, minor construction, ADPE, software and equipment. The public depots are investing the vast majority of their equipment dollars in replacement of obsolete and worn equipment.

In summary, the percentage of capital investments to sales in the public and private sectors is comparable. The percent for both sectors is less than 5% and varies (for 90-92 by 1.1% or less).

Since private industry's sales are 10 times as great as the public depot sales (100B vs. 10B), the absolute value of capital investments in the public depots vs private industry is substantially less (approximately one tenth the value of the private sector investment value).

**Listing of Significant Accounting Policy & Procedure
Pronouncements 88-93**

	DATE
<u>1989</u>	
Development of Financial Management System based on Cost Per Output	8/10/89
<u>1990</u>	
Total Cost Per Output Measures	4/10/90
Budget Execution of Cost per Output	5/7/90
Interim Stock Fund Policies	7/9/90
Unit Cost	8/8/90
Unit Cost Resourcing Guidance	10/15/90
<u>1991</u>	
DBOF/Unit Cost Development Div.	3/6/91
Supply Operations Unit Cost	6/3/91
DBOF Financial Policy and Responsibilities	7/2/91
DBOF Development Procedures	7/30/91
FY 1993 Defense Bud. Adjustments	8/2/91
FY 1992 Apportionment Review Requirements to Support budget Execution-DBOF/Unit Cost	8/9/91
Supplementary FY 1993 Defense Budget Guidance - DBOF	8/13/91
FY 1992 DBOF Financial management Guidance	8/19/91
Matrix for Converting Military Component Stock Fund and Industrial Fund Appropriation and Limit or Subhead Data to the Applicable Defense Business Operations Fund (DBOF) Appropriation and Limit or Subhead Data	9/12/91
Modifications to the Matrix for Converting Military Component Stock Fund and Industrial Fund Appropriation and Limit or Subhead Data to the Applicable Defense Business Operations Fund (DBOF) Appropriation and Limit or Subhead Data	9/17/91
DBOF Financial Policy	9/27/91
DoD Pricing Policies Study	10/2/91
Second Destination Transportation Funding Policy	10/8/91
Defense Business Operations Fund (DBOF) Reporting Requirements	10/11/91
DBOF Reporting Requirements	10/11/91
Standardization of Selected DoD Financial Operations	10/17/91
General and Administrative Cost Reimbursement	10/21/91

Standardization of Selected Activities of the DBOF on the Automated Payroll Cost and Personnel System	10/22/91
Addition to the Matrix for Converting Stock Fund Accounting Data to Business Operations Fund Accounting Data	10/29/91
Revaluation/Reclassification of Stock and Industrial Fund Inventory Values for Fiscal Year 1991 Year End Reporting	11/4/91
Adjustment Factors for Use in Adjusting Stock Fund Inventory Values to Latest Acquisition Cost for Fiscal Year (FY) 1991 Year End Reporting	11/4/91
DBOF Capital Budget Reprogramming	11/13/91
Defense Technical Information Center Billing Procedures	11/18/91
Reclassification of Procurement and Research Test and Evaluation Funded Items for Fiscal Year 1991 End Reporting	11/19/91
Adjustment Factor for Use in Adjusting Business Operations Fund Inventory Values to Latest Acquisition Cost for Fiscal Year (FY) 1992 Reporting	11/21/91
Modification to Adjustment Factors for Use in Adjusting Stock Fund Inventory Values to Latest Acquisition Cost for Fiscal Year (FY) 1991 Year End Reporting	11/22/91
DBOF Financial Guidance for Major Real Property Maintenance and Repair	12/24/91
SUBJECT	DATE
<u>1992</u>	
DBOF Implementation Plan (SEPARATE BOOK)	1/1/92
Defense Business Operations Fund Financial Guidance for Major Real Property Maintenance and Repair	1/15/92
Defense Business Operations Fund Accounting Requirements	1/15/92
Revenue Recognition Policy for the DBOF	1/21/92
Memorandum of Understand between ASD C31 and DoD Compt	2/5/92
Defense Commissary Agency G&A Cost Reimbursement	2/10/92
Accounting for Major Real Property Maintenance and Repair at Navy Industrial Activities	2/12/92
Strengthening DoD Transportation Functions	2/14/92
Supply Depot Consolidation	2/27/92
DBOF Implementation Plan (SEPARATE BOOK)	3/1/92
Interim Financial Policies for the Accelerated Distribution Depot Consolidation	3/19/92
Modifications to Defense Business Operations Fund Accounting Structure to Accommodate Establishment of the Joint Logistics Systems Center and Restructuring of the Navy Laboratories	3/23/92
FY 92 Funding of Hazardous Material Disposal	4/1/92
Financial Management Guidance for the Operation of the JLSC	4/1/92

Evaluation of Potential Candidates for Field Level Revolving Fund Accounting Systems	4/1/92
DoD Instruction 400.19 Subject: Interservice, Interdepartmental, and Interagency Support	4/15/92
Financial Guidance on Revenue Recognition Policy for the Defense Business Operations Fund	4/24/92
Selection of a Migratory System for General Funds Accounting	6/19/92
Modifications to Defense Business Operations Fund Accounting Structure to Accommodate Establishment of the Defense Information Technology Service Organization	7/10/92
FY 94/94 Customer Rates for the DBOF	7/17/92
Capital Asset Accounting Guidance for the Defense Business Operations Fund	7/21/92
Capital Asset Accounting Guidance for the Defense Business Operations Fund	7/21/92
DBOF Capital Budget	8/4/92
Barriers to Unit Cost Implementation	8/10/92
DBOF Report of Operations	8/11/92
FY 92 DBOF Execution Guidance	8/14/92
Accounting for the Defense Business Operations Fund	8/28/92
Capital Accounting and Depreciation/Amortization Processing and Valuation of Assets Under the Defense Business Operations Fund	9/14/92
Capital Accounting and Depreciation/Amortization Processing and Valuation of Assets Under the Defense Business Operations Fund	9/14/92
Defense Business Operations Fund Revenue Recognition Policy	9/17/92
Capital Asset Accounting Under the Defense Business Operations Fund	9/29/92
Major Real Property Maintenance and Repair-Accounting for Direct Costs and Reporting Obligations	9/30/92
Capital Accounting and Depreciation/Amortization Processing and Valuation of Assets at Department of the Navy DBOF Activities	10/13/92
Performance Budgeting	10/29/92
Second Destination Transportation Funding Policy	11/5/92
Defense Business Operations fund and Unit Cost Policy for Organization-Wide Productivity Gain Sharing	12/9/92
SUBJECT	DATE
1993	
Defense Business Operations Fund Pricing policy	1/4/93
Implementing the Defense Business Management Standard Migratory Systems	2/3/93

Defense Business Operations Fund Questions and Answers	2/8/93
Procedures for Approval of System Changes to Automated Financial management Information Systems	3/8/93
Guidance for Improvement of Defense Business Operations Fund Financial Reports	3/12/93
Improving Defense Business Operations Fund Reports	3/22/93
Guidance for Improvement of Defense Business Operations Fund Financial Reports	3/30/93
Defense Business Operations Fund Financial Guidance for Major Real Property Maintenance and Repair	4/8/93
Integration	4/20/93
Capital Asset and Major Real Property Maintenance Fiscal Year 1992 Expense Transaction	5/11/93
Defense Business Management System (DBMS) Release 93-2 Implementation Dates	5/24/93
Defense Business Operations Fund (DBOF) Equity Adjustments and Centralized Control of Cash	6/3/93
Defense Business Operations Fund Equity Adjustments and Centralized Control of Cash	5/12/93
Software Development of Defense Business Management System (DBMS)	6/7/93
Establishment of Senior Review Council	6/8/93

**DoD DEPOT MAINTENANCE CONTRACTS EXECUTED
IN FY 1992 & FY 1993**

SERVICE	ITEM	WINNER	1YR BID	1YR COST	VAR	SOW	SCHEDULE	DENIED
			\$MIL	\$MIL	%	\$MIL		
USA	M-113 ENG	PRIVATE	3.653	4.644	27%	0.991	YES/NO	NONE
USMC	AN/TPB-1	PRIVATE	0.373	0.373	0%	0	YES/NO	NONE
USN	FFG-54	PRIVATE	5.789	7.395	28%	1.606	YES/NO	NONE
USN	FFG-23	PRIVATE	5.759	6.932	20%	1.173	NO/NO	NONE
USN	FFG-61	PRIVATE	2.228	3.446	55%	1.218	YES/NO	NONE
USN	FFG-10	PRIVATE	1.705	1.869	10%	0.164	YES/NO	NONE
USN	LKA-115	PRIVATE	2.699	4.4	63%	1.701	YES/NO	NONE
USN	CG-47	PRIVATE	11.6	30.346	162%	18.746	YES/NO	NONE
USN	CG-60	PRIVATE	1.539	2.415	57%	0.876	YES/NO	NONE
USN	DD-968	PRIVATE	5.182	6.997	35%	1.815	YES/NO	NONE
USN	FFG-15	PRIVATE	1.223	1.389	14%	0.166	YES/NO	NONE
USN	DD-993	PRIVATE	1.386	2.582	86%	1.196	YES/NO	NONE
USN	CG-19	PRIVATE	6.918	10.303	49%	3.385	YES/NO	NONE
USN	DDG-995	PRIVATE	8.91	12.706	43%	3.796	YES/NO	NONE
USN	FFT-1085	PRIVATE	7.903	10.891	38%	2.988	YES/NO	NONE
USN	FFG-7	PRIVATE	1.054	1.992	89%	0.938	YES/NO	NONE
USN	CG-49	PRIVATE	12.289	20.873	70%	8.584	YES/NO	NONE
USN A	H-2 SDLM	PRIVATE	10.418	10.441	0.20%	0.023	NO/NO	NONE
USN A	AJB-3B	PRIVATE	1.152	1.152	0%	0	YES/NO	NONE
USN A	AN/APG-65	PRIVATE	2.898	2.898	0%	0	YES/NO	NONE
USN A	AN/AQH-7	PRIVATE	0.262	0.262	0%	0	YES/NO	NONE
USN A	AN/ARC-174	PRIVATE	0.091	0.091	0%	0	YES/NO	NONE
USN A	AN/ARC-182	PRIVATE	1.528	1.528	0%	0	YES/NO	NONE
USN A	AN/ARC-182	PRIVATE	0.043	0.043	0%	0	YES/NO	NONE
USN A	AN/ARR-78	PRIVATE	0.946	0.946	0%	0	YES/NO	NONE
USN A	F-18 APU	PRIVATE	1.336	1.336	0%	0	YES/NO	NONE
USN A	J-52 STAT	PRIVATE	0.336	0.336	0%	0	YES/NO	NONE
TOTAL	27		99.22	148.536	50%	49.366		

**DoD DEPOT MAINTENANCE CONTRACTS EXECUTED
IN FY 1992 & FY 1993**

SERVICE	ITEM	WINNER	1YR BID	1YR COST	VAR	SOW	SCHEDULE	DENIED
			\$MIL	\$MIL	%	\$MIL		
USA	2.5T ENG	PUBLIC	11.261	10.412	-7%	0	YES/NO	NONE
USA	PATRIOT L	PUBLIC	0.363	0.333	-8%	0	YES/NO	NONE
USA	RT-524/V	PUBLIC	2.175	2.035	-6%	0	YES/NO	NONE
USAF	AN/ARC-186	PUBLIC	0.734	0.78	6%	0	YES/NO	NONE
USAF	C-141 WING	PUBLIC	5.262	7.155	36%	0	YES/NO	NONE #2
USAF	C-5 SPD L	PUBLIC	1.291	1.221	-5%	0	NO/NO	NONE
USAF	CON SPD DR	PUBLIC	1.715	1.869	9%	0	YES/NO	.026 #1
USMC	M-923	PUBLIC	2.059	2.417	17%	0.358	YES/NO	NONE
USN	ADE-3	PUBLIC	10.389	16.7	61%	6.311	*	*
USN	AE-27	PUBLIC	8.4	13.7	63%	5.3	YES/NO	NONE
USN	SSBN-634	PUBLIC	9.6	7.2	-25%	-2.4	*	*
USN	SSBN-641	PUBLIC	9.944	11.5	16%	1.556	*	*
USN	SSN-614	PUBLIC	5.969	7	17%	1.031	YES/NO	NONE
USN	SSN-615	PUBLIC	8.634	8	-7%	-0.634	*	*
USN	SSN-650	PUBLIC	8.219	5	-39%	-3.219	*	*
USN	SSN-663	PUBLIC	9.64	7	-27%	-2.64	*	*
USN	SSN-679	PUBLIC	9.911	7.6	-23%	-2.311	*	*
USN	SSN-693	PUBLIC	11.985	10.2	-15%	-1.785	*	*
USN	SSN-702	PUBLIC	13.543	14.3	6%	0.757	*	*
USN	SSN-723	PUBLIC	30.4	36.7	21%	6.3	*	*
USN A	A-4 COMP	PUBLIC	4.296	4.296	0%	0	YES/NO	NONE
USN A	A-4 POS IND	PUBLIC	0.062	0.062	0%	0	YES/NO	NONE
USN A	AN/ARC-182	PUBLIC	0.144	0.144	0%	0	YES/NO	NONE
USN A	F-14 CAN	PUBLIC	3.043	3.043	0%	0	YES/NO	NONE
USN A	LAU-7 PS	PUBLIC	0.547	0.547	0%	0	YES/NO	NONE
USN A	P-3 RETRO	PUBLIC	34.7	35.2	1%	0.5	YES/NO	NONE
USN A	S-3 ACT	PUBLIC	0.321	0.321	0%	0	YES/NO	NONE
USN A	S-3 COMP	PUBLIC	0.08	0.08	0%	0	YES/NO	NONE
TOTAL	28		201.644	214.815	5%	9.124		

PUBLIC-PRIVATE COMPETITIONS

NOMENCLATURE	SECTOR OF AWARD	CONTRACT PRICE	NO. OF OFFERORS	BASIS OF AWARD
<u>AIR FORCE</u>				
C-141 Wingbox	Public	\$62.1 M.	4	SSF
C-5 Speedline	Public	\$34.8 M.	4	SSF
Heroux Landing Gear	Public	\$14.1 M.	8	SSF
F-16 APG66 Radar	Public	\$2.2 M.	5	P
KC-135 Boom	Public	\$9.5 M.	6	P
F-16 block 40 upgrade	Public	\$24.5 M.	2	SSF
C-130 Turbine Motors	Private	\$5.6 M.	5	P
TF-39 Blades	Private	\$4.3 M.	4	P
E-3 PDM/Mods	Public	\$35.8 M.	2	SSF
<u>ARMY</u>				
T53 Fuel Control	Private	\$30.5 M.	8	P
M109 Self Prop. How.	Public	\$4.4 M.	3	SSF
OH-58 Main Rotor	Private	\$2.6 M.	10	P
T142 Track	Private	\$5.0 M.	5	P
AN/UYQ43 Maneuver Cont.	Private	\$3.1 M.	2	P
M270 Rocket Launcher	Private	\$5.6 M.	2	P
<u>NAVY</u>				
F/A-18 Aircraft	Public	\$60.6 M.	4	SSF
J-52 Engine	Public	\$27.6 M.	5	SSF
ARC-182 Radio Set	Private	\$4.2 M.	3	P
CN1054A Gyro	Public	\$10.5 M.	2	P
P-3 ARR-78/ALQ 158 COMP	Private	\$3.4 M.	2	P
P-3 Gyro	Public	\$2.8 M.	2	P
F-18 Aux. Pwr Unit	Private	\$7.5 M.	2	P
SSN 750 Newport News	Private	\$7.4 M.	2	P
SSN 638 Whale	Public	\$4.8 M.	2	P
SSN 712 Atlanta	Private	\$7.4 M.	2	P
SSN 678 Archerfish	Public	\$4.8 M.	2	P
DDG 993 Kidd	Private	\$6.2 M.	4	P
AOE 4 Detroit	Public	<u>\$12.7 M.</u>	3	P
TOTAL		\$404.0 M.		

PUBLIC- PRIVATE COMPETITION

- 55 COMPETITIONS
ANALYZED**
- 27 PRIVATE AWARDS**
- 28 PUBLIC AWARDS**
- \$300.9M TOTAL BID
PRICE**
- \$359.4M ACTUAL COST**
- 19% COST GROWTH**

PUBLIC SECTOR AWARDS

- 28 AWARDS**
- \$201.6M BID PRICE**
- \$214.8M ACTUAL COST**
- 7% COST GROWTH**
- UNDER-RUNS STILL
PAID AT FIXED PRICE**

PRIVATE SECTOR AWARDS

- 27 AWARDS**
- \$99.2M BID PRICE**
- \$148.6M ACTUAL COST**
- 50% COST GROWTH**
- INCREASE APPROVED
BY CHANGE IN SOW**

APPENDIX G

EVALUATION OF DOD CORE POLICY AND METHODOLOGY

TASK 5: An evaluation of the manner of determining the core workload requirements for depot-level maintenance workloads performed by employees of the Department of Defense.

APRIL 1994

**DEFENSE SCIENCE BOARD
DEPOT MAINTENANCE MANAGEMENT TASK FORCE**

TASK 5: An evaluation of the manner of determining the core workload requirements for depot-level maintenance workloads performed by employees of the Department of Defense.

OVERVIEW

"It is essential for the national defense that Department of Defense activities maintain a logistics capability (including personnel, equipment and facilities) to ensure a ready and controlled source of technical competence and resources necessary to ensure effective and timely response to a mobilization,... contingency,... or other emergency requirement."¹ A significant contributor to high unit readiness and responsiveness is timely and effective weapon system maintenance. In order to ensure that mission-essential weapons are always combat ready, and to ensure responsive support during combat, Service Secretaries must make certain that the CINCs and their subordinate commanders have access to a ready and controlled source of the critical logistics products and services they need to fight and win. The ability to guarantee delivery of flexible and responsive industrial support represents the essence of DoD's depot maintenance mission — it is *the reason that the government depots and shipyards exist*. The capability to effectively support and maintain modern, high technology weapon systems is a perishable resource; it must be constantly exercised in order to be protected. In peacetime, depot commanders maintain their critical capabilities by performing industrial work on weapons and equipment selected from among those that will be used by the CINCs in combat, in accordance with current JCS contingency scenarios. The term "CORE" is used in this context to refer to those capabilities which must reside in the Service depots; the term "CORE workload" refers to the work retained in the organic depots to protect CORE capabilities.

This linking of critical depot maintenance *capabilities* and the workload needed to preserve those capabilities under a single concept called "CORE" is a relatively new policy within the Department of Defense. Although the word "core" can be found in discussions of depot maintenance in the 1970s and 1980s, its meaning then was essentially synonymous with "organic" — whatever workload was being accomplished by the DoD depots (regardless of why they were doing it) was "core", and whatever workload was in the private sector was "non-core." Programs were started in the mid-1980s to try to objectively define and quantify the requirement for organic depot maintenance. Beginning in 1986, the Joint Logistics Commanders combined a portrayal of peacetime workload with a projection of surge/mobilization requirements in a document called the *Program Objectives Summary* (POS). The POS served as a macro-level master planning document for the depot maintenance community and was used to justify infrastructure necessary to support anticipated wartime requirements. The

¹ Title 10, United States Code, Chapter 146, Section 2464

POS mobilization scenario was based on a protracted, all-out conventional war in Europe with the Warsaw Pact.

With the "Fall of the Wall," the all-out war scenario was no longer a basis for planning, and a period of geopolitical and fiscal retrenching began. The Services were asked to recompute their force structure requirements and, at the same time, to reassess their need for large organic support infrastructures. Several draft Defense Management Review Decisions (DMRDs) were published in late 1989 which sought to guide the Services' depot maintenance downsizing. In June 1990, the Deputy Secretary of Defense issued a memorandum entitled "Strengthening Depot Maintenance Activities." This memorandum and subsequent DMRDs forced DoD depot planners to consider economy and efficiency to a much greater degree than had been the case in the past. The focus changed from mobilization planning to business planning.

While embracing and aggressively implementing innovative private-sector business practices such as Total Quality Management and Theory of Constraints, the Services continued to express concern that not all depot maintenance functions performed are necessarily based on least cost; i.e., many functions exist because of the requirement that defense activities maintain a flexible logistics capability which can ensure combat commanders access to a ready and controlled source of technical competence and resources needed to support readiness and sustainability. As a result, the Secretary of Defense developed the following definition of CORE:

CORE is an integral part of a depot maintenance skill and resource base which shall be maintained within depot activities to meet contingency requirements. It will comprise only a minimum level of mission-essential capability either under the control of an assigned or jointly determined DoD Component where economic and strategic considerations warrant.

This definition of CORE was then applied by each Service to its respective resource base to quantify its CORE depot maintenance workload. Although the specific methodologies differed, Services identified, by weapon system, the amount of organic "CORE workload" needed to retain the necessary resource base. The results of these computations by the Services using their individual methodologies varied widely ranging from about 25 percent to about 60 percent of current total peacetime workload.

In 1991, Congress passed legislation that had the effect of establishing a new, de facto definition of CORE. Section 314(a) of the National Defense Authorization Act for FY92 and FY93 required that "... not less than 60 percent of the funds available for each fiscal year for depot level maintenance of Army and Air Force materiel shall be used for performance of such depot level maintenance by employees of the Department of Defense." In 1993, Title 10 of the U.S.C. was amended to further expand this restriction to include the Navy, and required that the Military Departments may not contract performance by non-Federal government personnel of more than 40 percent of the depot level workload. Additionally, the Secretary of the Army was required to provide

for the performance by DoD employees of not less than the following percentages of Army aviation depot-level maintenance: FY93 - 50 percent, FY94 - 55 percent, FY95 - 60 percent. One effect of this legislation was to, once again, decouple the concept of "core" from the notion of mission-essential capabilities favored by DoD. By arbitrarily defining CORE as 60% of the total DoD depot maintenance workload (which, not coincidentally, represented the status quo at the time the legislation was drafted), the Congress inadvertently reinforced the early-1980s notion that "CORE" and "organic" are synonymous. Although lacking an objective rationale, the "60/40" requirement has been cited by well-intended opponents of depot downsizing to argue that operational risk will go up if more than 40% of DoD's depot work is given to private industry.

In August 1992, the Office of the Secretary of Defense published DoD Directive 4151.18, *Maintenance of Military Materiel*. This policy document reinforced the previous DoD definition of CORE as follows:

Core Maintenance. An integral part of a depot maintenance skill and resource base that shall be maintained within depot activities to meet contingency requirements. Core will comprise only a minimum level of mission-essential capability and must be under the control of an assigned individual DoD Component or may be a consolidated capability under the control of an assigned or jointly determined DoD Component where economic and strategic considerations warrant.

The current concept of CORE is an evolutionary refinement of the DoD 4151.18 guidance. It was developed by a Joint-Service study team during the Summer of 1993, and was promulgated by Deputy Under Secretary of Defense for Logistics James R. Klugh in a 15 November 1993 memorandum entitled *Policy for Maintaining CORE Depot Maintenance Capability*. The hallmark of the current CORE guidance is its focus on risk management (primarily the risks associated with operational readiness and sustainability, but also life-cycle cost) as the basis for cataloging and quantifying depot support capabilities which must be retained in the organic base. The defense depots and shipyards are seen as powerful resources available to each Service Secretary to help reduce the risks associated with combat operations by providing operational commanders with flexible and effective industrial support.

During its discussions of CORE, the Task Force encountered two distinct paradigms, each of which produces a different policy for assigning depot maintenance responsibilities within the Department of Defense. The first paradigm exists in the context of Service roles and missions. Those working within this paradigm believe that policy makers and planners have an obligation to couple the responsibilities assigned to the Service Secretaries with the authority needed by these Secretaries to meet their responsibilities. Specifically, this manifests itself as a belief that it is the prerogative of each Service Secretary to determine where to preserve the depot support capabilities critical to Service readiness and combat support. Based on this belief, each Service Secretary is given the authority to make a Service depot or shipyard commander

responsible for preserving critical CORE capabilities (or for asking another Service to accept this responsibility under a DMISA agreement); this approach can be thought of as the "Service CORE" paradigm.

The alternative paradigm is based on a global context of industrial economies and efficiencies. While it does not downplay the importance of DoD depots for weapon system readiness and sustainability, it officially recognizes only a single Department of Defense industrial infrastructure and a single commercial industrial infrastructure. Those comfortable with this paradigm envision these two infrastructures as large repositories of capabilities and capacities each bounded by an external wall, but not separated by internal walls within. In the organic base, the capabilities inside the walls are thought of as belonging to the Secretary of Defense. The specific capabilities needed to ensure a ready and controlled source of critical depot products and services are collectively called "DoD CORE", and responsibility for protecting and preserving these capabilities can easily be distributed by the Secretary of Defense anywhere within the infrastructure.

In the course of its deliberations, the Task Force, less the Air Force, came to believe that Service CORE provides more responsive support to warfighters, while not necessarily adding to costs. CORE is justified because it contributes to reduced operational risk, and Service CORE achieves the greatest reduction possible. While the economies and efficiencies attributed to DoD CORE have legitimate potential when applied to depot *workload*, these attributes lose real meaning in the context of critical depot maintenance capabilities. If the Navy has some of its work interserviced to the Air Force, or contracts with a commercial company for a depot maintenance product, the Navy is not relieved of the responsibility for ensuring that the product gets to the operational customer. On the other hand, if the responsibility for preserving a CORE capability is taken from one Service and given to another, then the first Service is *relieved of responsibility for the operational support associated with that capability!*

Current management philosophy within the Department, reflecting the recommendations of the Packard Commission, emphasizes centralized policies and decentralized execution. Service-specific CORE based on a DoD-wide methodology appears to be consistent with this management philosophy.

As previously discussed, CORE is targeted directly to the Joint Chiefs' combat contingency scenarios. CORE has two quantifiable components – readiness CORE which seeks to ensure that depot support is never a constraint to operational readiness, and sustainability CORE which seeks to ensure that operational commanders' ability to restore equipment to service during combat is never constrained by a lack of depot support (Figure G-1).

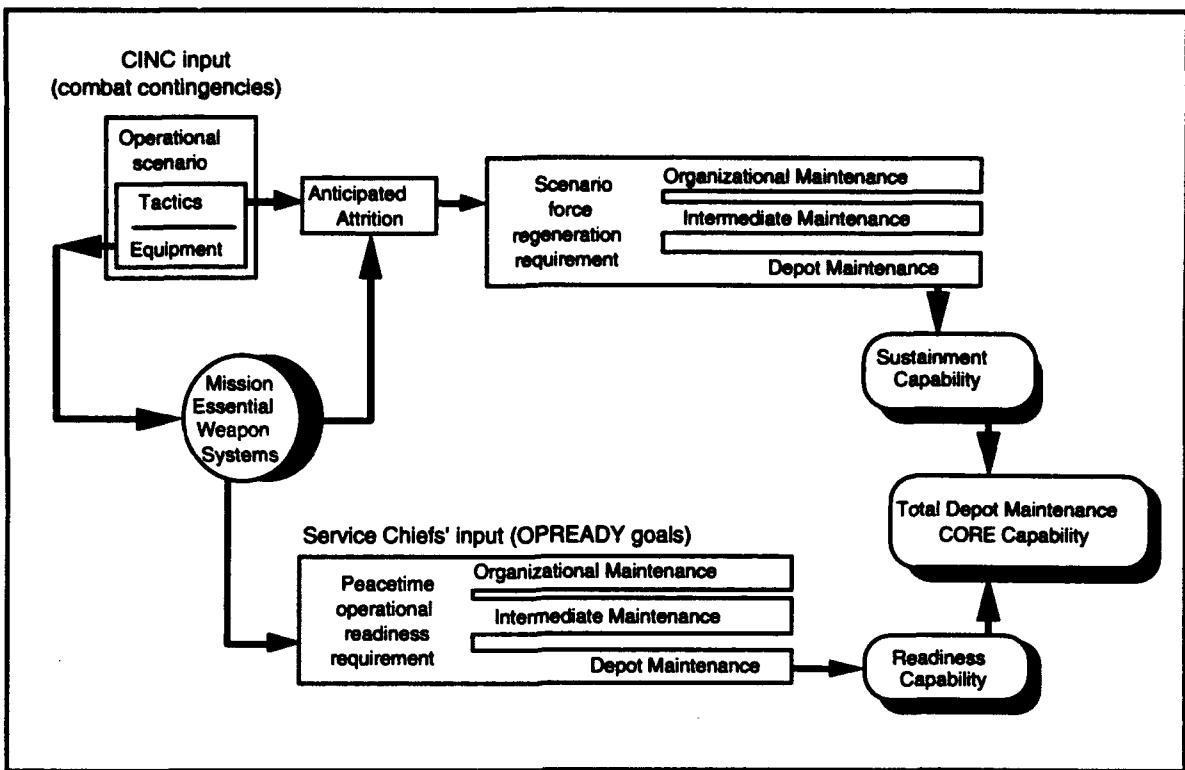


Figure G-1
Risk Avoidance = Operational Readiness + Combat Sustainability

Service Secretaries must have the authority to direct selected depot workload for the *express purpose* of avoiding the risk of potentially unresponsive support to the operational commanders.

The current DoD CORE policy memorandum describes CORE in these terms:

Depot maintenance CORE is the capability maintained within organic Defense depots to meet readiness and sustainability requirements of the weapon systems that support the JCS contingency scenario(s). CORE exists to minimize operational risks and to guarantee required readiness for these weapon systems. CORE depot maintenance capabilities will comprise only the minimum facilities, equipment and skilled personnel necessary to ensure a ready and controlled source of required technical competence. Depot maintenance for the designated weapon systems will be the primary workloads assigned to DoD depots to support CORE depot maintenance capabilities.

The Task Force endorses the DoD definition of CORE, both in terms of the basic concept and in terms of the specific features ascribed to the concept. The most salient features are as follows:

- CORE consists of organic depot maintenance capabilities that exist within government depots and shipyards.
- CORE is needed to assure that readiness and sustainment requirements related to JCS scenarios are met. CORE is justified when it minimizes operational risks and demonstrably supports required readiness.
- The Services will preserve their CORE capabilities with the minimum infrastructure (facilities, equipment and personnel) required; depot capacity beyond that needed for CORE will be used only for "last source of repair" and cost control workload (as approved by the DDMC).
- The primary workloads assigned to depots in support of CORE capabilities should be maintenance of weapon systems included in JCS combat contingency scenarios.

These features have important implications in terms of clarifying the scope and nature of depot activity. First of all, the definition of CORE as organic capability means that it consists of skills and competencies, not work on specific weapon systems; it is not necessary that specific contingency weapon system workload be retained but rather that a capability relevant to that weapon system be preserved. It is important to emphasize that CORE is the capability to support, not the maintenance of specific weapon systems. One clear implication of this policy is that mission-essential equipment can be maintained by private-sector contractors without violating the assumptions underpinning CORE.

Second, the requirement for CORE is tied directly to threats detailed in contingency scenarios approved by the Joint Chiefs of Staff. Thus, maintenance capabilities that are not required in support of scenario weapon systems cannot properly be characterized as CORE. Moreover, a reduction in the range or intensity of contingencies envisioned by the Joint Chiefs should logically result in a diminished requirement for CORE maintenance workload. For example, the CORE requirement for the current JCS two-regional war scenario is, by definition, a fraction of the old Cold War requirement. Likewise, a change in scenario tactics and/or weapon system employment will require a review of CORE capabilities and, perhaps, a recomputation of the workload needed to protect those capabilities.

Third, depot capacity maintained to support CORE capabilities should consist of no more than the minimum assets needed to preserve those capabilities. The DoD CORE policy is silent on the subject of non-CORE workload, but it does not specifically provide for the retention of a large organic industrial infrastructure and significant amounts of non-CORE work based on the premise that "economies of scale" will reduce the cost of CORE.

Finally, the statement that "depot maintenance for the designated weapon systems will be the primary workloads assigned to DoD depots to support CORE depot maintenance capabilities" imposes a significant limitation on the scope and nature of future DoD depot activity. Service shipyards and depots exist to maintain weapons, not upgrade them. Major alterations in weapon system capability or configuration requiring design, developmental testing or production work are not "depot CORE". It follows that modifications, upgrades and conversions will normally be carried out by private industry.

DISCUSSION

CORE is an organic base comprised of skilled personnel (with requisite knowledge and ability), facilities, and equipment — all maintained to ensure that the required technical capability exists to support mission-essential weapon systems and equipment. Although CORE exists to provide a capability (in reality, of course, many capabilities), it ultimately manifests itself as workload.

To compute the minimum workload needed to preserve CORE capabilities, the Services use a jointly developed process or methodology. The most important aspect of this methodology is that it is driven by the requirements of the JCS contingency scenarios, rather than by any desires from the maintenance depots. This methodology is not meant to be a cook book recipe which is insensitive to Service-unique operating and support procedures. Rather, it is an *objective process* by which *subjective assumptions* can be documented and related one to another in pursuit of a logical and internally consistent result — a result which meets each Services' differing depot industrial requirements while still supporting the overall DoD CORE policy.

The DoD CORE methodology, expanded slightly for clarity, is presented here. In order to help explain the process, an example of its application based on an imaginary fighter aircraft (the "F-99") is shown in Attachment A to this Appendix.

Step A. Identify the specific types and the quantities of mission essential equipment to be used in the JCS approved contingency scenario(s).

Step B. Determine an annual peacetime depot workload factor per unit based on historical data or experience with similar equipment. Make conversions (accelerating or derating the requirement for depot-level support) based on anticipated failure factors due to op tempo adjustments and/or scenario driven environmental/combat attrition factors.

Step C. Compute scenario depot maintenance workload based on scenario readiness, sustainability and technology requirements applied to the quantity of weapon systems assigned to the scenario (only).

Step D. Determine the minimum quantity of depot-level skills, including engineering, required to support scenario requirements. Express this quantity in direct labor hours, labor days, or other appropriate measure (by skill category, by weapon system).

Step E. Combine redundant or overlapping skills and partial man years to achieve the lowest possible workload needed to fully support CORE capabilities. Adjust for depot surge capacity. This provides the latitude necessary to accommodate the difference between peacetime and surge (contingency) production capacity.

Step F. Calculate basic CORE workload requirement for each scenario weapon system. Assign selected CORE responsibilities to one or more Service depots and distribute CORE-related work assignments accordingly.

Step G. Review Service depot capacity utilization. Apply an efficiency/economy factor to each Service depot performing CORE work to maximize the productive output achieved with available CORE-related resources. This workload adjustment ensures that valuable CORE capabilities are fully and efficiently utilized rather than being left idle for long periods of time awaiting work.

CONCLUSION

The Task Force finds that the current manner of determining CORE workload requirements for depot-level maintenance performed by employees of the Department of Defense is satisfactory. The CORE depot maintenance policy promulgated by the Deputy Under Secretary of Defense in his 15 November, 1993 memorandum is an appropriate response to the requirements imposed by Title 10, United States Code, Chapter 146, Section 2464. The Task Force feels that readiness drives CORE and that readiness is a Service Secretary responsibility. Except for the Air Force, the Task Force believes that CORE policy should be implemented within the Department at the Service Secretary level. The Task Force recommends that the Deputy Under Secretary should clarify this point, and republish his CORE policy memorandum as a more formal Department of Defense Directive at the earliest opportunity. The workload sizing methodology which accompanies the DoD policy document is adequate. It provides guidance to help the Services select from all potential depot workload that which should be retained in the Service depots and shipyards to protect critical CORE capabilities. However the Task Force feels that the slightly expanded version which appears in this Appendix clarifies a few controversial points and should be incorporated in the new DoD Directive.

**COMPUTING THE MINIMUM ORGANIC WORKLOAD NEEDED TO PRESERVE
DOD CORE DEPOT MAINTENANCE CAPABILITIES**

ATTACHMENT A to APPENDIX G

COMPUTING THE MINIMUM ORGANIC WORKLOAD NEEDED TO PRESERVE DOD CORE DEPOT MAINTENANCE CAPABILITIES

By preserving critical (core) depot maintenance capabilities, each Service minimizes the risk that operational commanders will be constrained in the execution of assigned combat missions because of untimely industrial support. Specifically, depot core is designed to ensure that front line unit commanders are never placed in a position of having to negotiate for readiness. By preserving core capabilities, the depots and shipyards protect their ability and capacity to meet the CINCs' priority industrial support needs. But, of course, not every depot-level capability is critical, and not all available workload is needed to protect those which are. The number of combat units earmarked to participate in current JCS contingency scenarios is somewhat less than the total active and reserve population; many units, and many weapons, will be held in reserve or cycled into combat as other forces are withdrawn. For this reason, and because much equipment in the DoD inventory is not part of any JCS scenario¹, the maximum amount of workload brought into the organic base in support of core need only be a portion of the total peacetime requirement. Because there is both a large investment expense and a significant annual recurring cost associated with operating a government depot or shipyard, it is appropriate that each Service should retain only the *minimum* depot workload and, by extension, should retain only the *minimum* depot infrastructure, needed to preserve core capabilities².

To compute the minimum workload needed to preserve core capabilities, the Services use a jointly developed process or methodology. This methodology, described below, is not meant to be a cook book recipe which is insensitive to Service-unique desires and requirements. Rather, it is an *objective process* by which *subjective assumptions* can be documented and related one to another in pursuit of a logical and internally consistent result -- a result which meets each Services' slightly differing needs while still supporting the overall DoD core policy.

CORE METHODOLOGY

Each Service Secretary is responsible for the readiness of his or her forces. In support of readiness, it is incumbent upon the Secretary to ensure a ready and controlled source of mission-critical logistics products and support services. Each Secretary is, therefore, responsible for the quantity and quality of maintenance, including depot maintenance, performed on Service weapons, and each Secretary has the authority to direct workload to a shipyard or depot for the express purpose of

¹ Training aircraft, for example.

² There are a number of legitimate reasons for a Service Secretary to size one or more depots at a level of capacity slightly higher than minimum core. The exercise of this prerogative is not constrained by the DoD core policy.

protecting capabilities which are needed to successfully accomplish depot maintenance³. Since, in execution, the workload which is used to preserve a skill or competency will be selected from a pool of all items requiring that skill or competency, the Services have considerable discretion in deciding which workload is retained in the organic base. It is not necessary that a *specific* weapon system be retained, but rather that a capability relevant to that weapon system and/or technology be preserved. On the other hand, it makes little sense to select as core workload those items which are not part of any JCS combat contingency scenario, and which, therefore, have little or no likelihood of being used in combat. The purpose of the DoD core methodology is to guide the Services in selecting from all possible depot workload opportunities, those products and services which simultaneously preserve core *and* maximize mission essential weapon system operational readiness and sustainability.

The DoD core methodology, paraphrased slightly for clarity, is presented here. In order to help explain the process, an example using an imaginary weapon system (a fighter aircraft, the F-99) is also shown.

Step a. Identify the specific types and the quantities of mission essential equipment to be used in the JCS approved contingency scenario(s).

Among all of the weapon systems this Service plans to use to meet its JCS contingency scenario missions are 160 F-99 fighter aircraft.

Step b. Determine an annual peacetime depot workload factor per unit based on historical data or experience with similar equipment. Make conversions (accelerating or derating the requirement for depot-level support) based on anticipated failure factors due to op tempo adjustments and/or scenario driven environmental/combat attrition factors.

The F-99 aircraft requires depot-level maintenance on average once every seven years. Each overhaul takes an average of 8000 Direct Labor Hours (DLHs). The annual depot workload factor per unit is, therefore, 8000 DLH divided by 7 = 1143 DLHs per aircraft per year. Based on scenario planning and past history, we anticipate that each F-99 used in combat will require, on average, one-third more depot maintenance than it would have if it had only been flown in peacetime training exercises. We therefore accelerate the peacetime workload factor by 1/3 (multiply 1143x1.33) resulting in an anticipated scenario depot workload factor of 1520 DLHs per aircraft per year.

Step c. Compute scenario depot maintenance workload based on scenario readiness, sustainability and technology requirements applied to the quantity of weapon systems assigned to the scenario (only).

³ In exercising this authority, it is the prerogative of the Secretary to select a Service depot, or to negotiate with another Service regarding the preservation of capabilities critical to the readiness of his or her operating forces.

Since each F-99 will "burden" the depot by 1520 DLHs per year, and since there are 160 F-99's in the scenario, we therefore anticipate a need to expend $1520 \times 160 = 243,200$ (round down to 243,000) DLHs per year to support this one weapon system.

Step d. Determine the minimum quantity of depot-level skills, including engineering, required to support scenario requirements. Express this quantity in direct labor hours, labor days, or other appropriate measure (by skill category, by weapon system).

At this point we have approximated the gross total "capacity" or "infrastructure size" (in DLHs) for F-99 core workload, but we must articulate this in terms of specific skills or capabilities in order to ensure that we understand the real F-99 core requirement and that we don't undersupport or oversupport one or more capabilities. Each time an F-99 is reworked, dozens of maintenance and engineering skills are exercised. Some of these capabilities are peculiar to the F-99 aircraft; many are common to more than one type of aircraft in the Service inventory. Each of these skills needs to be cataloged and the associated F-99 DLHs documented. A depot maintenance skills inventory is published bi-annually by the Joint Depot Maintenance Analysis Group (JDMAG), a staff supporting the Joint Logistics Commanders.⁴ For purposes of the F-99 model, we assume that a careful "bottom up" capabilities analysis has been completed, and the different kinds of F-99 depot maintenance skills grouped into five functional areas: F-99 Cleaning and Stripping = 13,000 DLHs; F-99 Disassembly = 16,000 DLHs; F-99 Piece Part Fabrication and Repair = 156,000 DLHs; Generic Industrial Processes = 43,000 DLHs; F-99 Test and Inspection = 15,000 DLHs.⁵

⁴ "Depot Profiles"; Joint Depot Maintenance Analysis Group, Technology Assessment Division. For Official Use Only.

⁵ These five functional areas are the same ones used by JDMAG and are, therefore, convenient and somewhat standardized. However there is no requirement that this or any other specific "roll-up" of depot maintenance capabilities be used by the Services.

Step e. Combine redundant or overlapping skills and partial man years to achieve the lowest possible workload needed to fully support core capabilities. Adjust for depot surge capacity. This provides the latitude necessary to accommodate the difference between peacetime and surge (contingency) production capacity.

Its critically important that the breakout accomplished in Step d be completed, not only so depot managers acquire visibility into the specific F-99 depot maintenance capabilities they need to preserve and protect, but also so that smart core workload decisions can be made across co-located scenario weapon systems. In Step e, we have an opportunity to make two adjustments which can drive down the amount of workload which must be brought into the depot (thus reducing infrastructure size and cost), without adversely impacting core capabilities. First, if there is more than one scenario aircraft supported at the F-99 depot (a likely situation), then it is probable that some of the common capabilities (with overlapping DLHs) can be combined based on economies of scale or other efficiencies. Examples might be pattern making, plating or painting. For purposes of this exercise, we have found that we can reduce our F-99 core workload requirement in the Industrial Processes functional area by 20,000 DLHs because a number of capabilities are already being adequately protected using workload from another mission-essential scenario aircraft, and there is no risk that operational support will be compromised because we "doubled up" in these areas. By dropping these Direct Labor Hours, our F-99 core workload is now down to 223,000 DLHs per year. Next we adjust for depot surge capacity. This is a DoD standard adjustment which recognizes that, in peacetime each depot employee normally works 8 hours per day, 5 days per week, and is away from work a predictable number of hours per month for leave, training and administrative time allowed. However, in the event of a national military emergency, the DoD depots would all surge their operations, in the process canceling unnecessary leave, training and administrative activities and working current employees overtime (for planning purposes, 10 hours per day, 6 days per week). The result of surge is that, for a short period of time (notionally six months maximum), the existing infrastructure can generate 1.6 times the DLHs it produces under normal peacetime operations. This factor is important to the calculation of minimum required core workload, because it means that a depot commander will likely be able to protect core capabilities during peacetime with fewer DLHs because, without adding additional resources, he can surge up to the predicted scenario requirement. We incorporate the DoD surge factor by dividing our previous DLH total by 1.6. The result, in this F-99 example, is 223,000 divided by 1.6 = 139,375 DLHs per year. What this tells us is that a depot infrastructure (employees, facilities, industrial equipment, etc.) sized to comfortably generate 139,375 F-99 DLHs per year in peacetime can, for the period of surge be expected to generate F-99 products and services at the rate of 223,000 DLHs per year.

Step f. Calculate basic core workload requirement for each scenario weapon system. Assign selected core responsibilities to one or more Service depots and distribute core-related work assignments accordingly.

We are now ready to compute the minimum number of F-99 aircraft we need to induct each year. We've determined that 139,375 DLHs are needed to protect core capabilities and support minimum scenario readiness requirements. Since each F-99 consumes 8000 DLHs per rework, the minimum annual production is 17.4 aircraft. "Depot South" is the current F-99 rework activity, and is assigned responsibility for preserving F-99 depot maintenance core capabilities.

Step g. Review Service depot capacity utilization. Apply an efficiency/economy factor to each Service depot performing core work to maximize the productive output achieved with available core-related resources. This workload adjustment ensures that valuable core capabilities are fully and efficiently utilized rather than being left idle for long periods of time awaiting work.

The final workload calculation applies a "sanity factor" to the product of Step f. In the case of our F-99 example, the specified depot turn-around-time is 174 days. That means the operational commander expects to get his reworked F-99 back from the depot not later than 6 months after it was inducted. To meet this requirement, the depot commander could size his infrastructure to handle all 17.4 aircraft at the same time, but that would mean his workers, facilities and machine tools would all be idle for 6 months of the year -- a very low risk, but high cost proposition!. Alternatively, the commander could size his infrastructure to handle exactly half the workload, completing 8.7 aircraft the first 6 months and 8.7 more the second 6 months of the year. This would minimize infrastructure cost but leave zero flexibility in the event of an unanticipated problem -- a high risk situation (If even one of the F-99s was a "dog" and needed substantially more than 8000 DLHs to complete, the depot could not meet its delivery schedule). A realistic F-99 production plan would retain enough infrastructure (capacity) to do about 10 aircraft at a time. This would ensure that the minimum 17.4 could be delivered on schedule and, if there were no "dogs", provide for an additional 2 or 3 aircraft to keep the workforce gainfully employed through the end of the fiscal year. The intent of this workload adjustment is only to efficiently utilize the resources put in place to accomplish minimum core -- no significant employee hiring and certainly no additional facilitization is contemplated in Step g. Applying the logic just discussed, our final F-99 core workload is 20 aircraft per year.

(To simplify the F-99 example just presented, no attempt was made to compute or integrate the depot maintenance workload needed to protect core capabilities applicable to the aircraft's two gas turbine engines nor any mission essential special support equipment that might be forward deployed with the weapon to support the JCS scenario. These calculations would have to be performed to present the complete F-99 core workload picture.)

APPENDIX H

RATES AND PRICE

TASK 6: A comparision of the methods by which the rates and prices for depot-level maintenance workload performed by employees of the Department of Defense are determined with the methods by which such rates and prices are determined for depot-level maintenance workloads performed by non-Federal Government personnel.

APRIL 1994

**DEFENSE SCIENCE BOARD
DEPOT MAINTENANCE MANAGEMENT TASK FORCE**

TASK 6: A comparison of the methods by which the rates and prices for depot-level maintenance workloads performed by employees of the Department of Defense are determined with methods by which such rates and prices are determined for depot-level maintenance workloads performed by non-Federal Government personnel.

INTRODUCTION

RATES. Consists of various cost elements applied to prepare bids stated in a cost per unit of measurement. The major categories of cost elements are: direct labor rates, indirect rates, and General and Administrative (G&A) rates. The normal unit of measurement is cost per hour. The rate is then applied to a specific workload (number of units, or direct labor hours) in order to determine an hourly rate for a particular job. The hourly rate is then used as either a Defense Business Operations Fund (DBOF) stabilized rate, or as a competitive rate if workloads are competed.

PRICES. This is the specific charge for performing either DBOF workload (contract line(s)) or for performing workload in a competition.

BACKGROUND

STABILIZED RATES AND PRICES

A brief explanation of stabilized rates and prices is provided in order to explain the rate systems in use at the public depots. Stabilized and competitive rates and prices, although not required to be identical, are both required to recover expected costs as defined by generally accepted accounting principles.

CONCEPT

Beginning with Fiscal Year 1976, the rate stabilization program which applies to all industrial activities within the Department of Defense was implemented in phases. Full implementation was accomplished in Fiscal Year 1977.

Rate stabilization is basically the development and utilization of predetermined rates for the billing of customers (sponsors) for work to be accomplished at industrial activities. Each industrial activity is required to establish fixed rates which may be expressed as costs per man-hour, man-day, unit of output, unit of input, or any manner which best suits the nature of the effort. An activity may have a single rate or as many rates as warranted. The activity group manager approves the number and kind of rates

to be established based on each activity's organizational structure, diversity of workload, and other management considerations.

The following items are excluded from the rate stabilization program, and are billed to customers (sponsors) on the basis of actual costs incurred in accordance with current procedures.

- Cost of work performed and services rendered for foreign military sales customers.
- Cost of work performed and services rendered for private parties and other non-Federal Government customers.
- Contractual services obtained for the benefit and/or at the request of a specific customer.
- Base closure costs.

DETERMINATION OF BILLING RATE

In developing and establishing rates, each activity must devise a sufficient number of rates to ensure that the rate system is a reasonable model of the actual cost of performing the various categories of work or services covered by the rates. Stabilized rates submitted by the activities are reviewed and adjusted by the activity group manager, to provide the necessary changes to equal the annual cost authority required to support activity operations, based on actual workload to be realized. It is expected that the annual operating cost authority will be allocated to activities with a business area by establishing individual annual activity unit cost goals. Changed conditions resulting from the OSD review of the activity group managers' A-11 Budgets, and changes in the customer programs occurring during the budget review cycle will result in yet another review and adjustment of the stabilized rates, if required by circumstances such as an increase or decrease in the program.

Rates remain in effect for an entire fiscal year and are stabilized for all orders reviewed during the year. As an example, shipyards use approved stabilized rates to bill overhaul, repair, and alterations starts throughout the entire period of execution of the reimbursable order, regardless of the number of fiscal years involved. The stabilized rates approved for the current fiscal year are used to bill customers (sponsors). Rate changes, during the fiscal year, are expected to be rare and may be made only upon approval of the Department of Defense Comptroller. Requests for rate changes are submitted via chain of command and must be accompanied by appropriate justification.

The proposed stabilized rates are developed by the activity and tentatively approved by the activity group manager at the outset of the annual Budget Review cycle which begins approximately fifteen months prior to its execution. Since changes can occur to the A-11 Budget during the management command, service, and OSD/OMB reviews, the final stabilized rates are determined upon conclusion of the OSD/OMB review.

USE WITH FIXED PRICE WORK

A fixed-price order is defined as a request for work or services at a delivered price mutually agreed upon prior to the commencement of any work on an order. When a fixed price is mutually agreed upon, the activity accepts the responsibility for performing the specific work or services of the order at the price quoted in the order. Fixed price work can be negotiated on the basis of the prevailing and applicable stabilized rates. For example, if the stabilized rate in a particular instance is expressed as "cost per direct labor hour", then the fixed price work is negotiated on a single variable which is the estimated number of hours required to do the work. Any fixed price gain or loss will be the result of a variance in the number of hours the work takes when compared to the estimated number of hours required to do the work. Fixed price orders are subject to renegotiation only when the scope of the order changes.

COMPETITIVE RATES AND PRICES

In developing competitive cost proposals for public to public competitions or for consolidation studies, a workload allocation base upon which the bids will be developed includes approved CORE, current funded non-CORE, and the specific workload covered under the bid. Other potential workloads will not be considered for costing purposes when competing for a workload in the public to public arena. However, for public/private bids, a best estimate of the workload that could be won as a result of competition may be included for overhead (i.e. production overhead, general and administrative) expense absorption. This estimate should be approved by the management command of the activity and supported by previous competition results. Furthermore, noncompetitive workload will not be used to finance costs that are properly identified as competitive workload costs.

Generally accepted accounting principles are followed. These principles are in compliance with Cost Accounting Standards (CAS) as incorporated in DOD 7220.9-M. Compliance is evaluated by the Defense Contract Audit Agency (DCAA) during audits of the depot accounting systems and certification of competition proposals. Competitive proposals only include cost estimates for the work specified to be accomplished in the Statement of Work (SOW). Additionally, RFP also may contain work items to be accomplished only on an "as required by inspection" basis. This work

is identified in the Request for Proposal (RFP) or in the Invitation for Bid (IFB). The inspections, and the work to be accomplished as a result of these inspections, is based on standard industry practice.

- Cost elements and allocation procedures for overhead expenses are the same for all work at the depot which is competing or being considered for consolidation.
- Cost proposals are based on the current best estimate of costs to accomplish the job. They will include an appropriate share of overhead based on the actual planned workload at the activity. This does not equate to the stabilized rate developed for the Congressional budget but rather the current estimate of costs at the time of bid submission.
- Management discounts or other "bottom line" adjustments to price may not be offered, nor will positive or negative surcharges be included.
- All comparisons are based on a unit price basis and are extended by the proposed customer quantity in order to provide a baseline for adjustments.

These cost procedures are designed to guide decision making process for both lead Service consolidation and for competitive award of workload when applicable. All of the depot maintenance cost associated with the production of the workload under consideration for competition or consolidation are identified and accounted for in accordance with DOD 7220.9-M. All costs are included regardless of funding source (appropriated or revolving funds). However, any costs excluded from the bid are clearly quantified and identified on the Cost Comparability Worksheet. Government proposals will not include cost adjustments for profit and loss, cost of money, and income taxes.

COST PROPOSAL DEVELOPMENT

A total competitive unit cost will be developed by estimating the actual production hours required to accomplish the contract line items in the statement of work and multiplying the hours by the direct labor and overhead rates developed for the bid. The rate may be independent of any previously established rates developed in the budget. Direct material and other costs will be added to the total labor and overhead costs to arrive at a bid price.

Unit cost will also be used for workloads which are considered services or which are normally sold at hourly sales rates. This requires that a deliverable be defined and the unit then becomes the defined deliverable.

COMPETITIVE ISSUES

GAINS AND LOSSES

For Department of Defense depots, a bid will not knowingly include either a gain or a loss for the specific elements of work covered by the bid. A gain is an excess of revenue over costs incurred. A gain occurs when the contract workload is executed below the contract price as awarded. A loss occurs when costs incurred exceed revenues. Gains incurred during execution of the work are retained and separately identified.

If financial problems arise during the execution of the work assignment, then the performing depot should notify its command for assistance in resolving the problem. The depot should notify their command when a loss is expected on a fixed price, or on a project order funded work assignment. The depot and command will review the cause for the loss. If the cause is determined to be beyond the control of the performing activity, the customer will be contacted in an attempt to recover the loss. If the loss is the responsibility of the performing activity, the normal competition loss recovery procedures will apply.

OVERHEAD (G&A)

Overhead cost are not allocated to a final product under competition as an indirect cost if similar costs are charged as direct to the same or similar products or workloads not under competition (i.e. allocation procedures must be rational and consistent).

General and Administrative (G&A) overhead expenses use a consistent method for application to all workloads. Any changes in the method for developing G&A rates shall be applied consistently to both competitive and noncompetitive workloads.

Changes in overhead expense development and allocation procedures directed subsequent to a competitive cost proposal will apply to the competition workload during execution. Any gains or losses caused by these changes will be included in the final accounting of actual costs against the contract bid price.

Production overhead expenses are applied to the benefiting product.

Asset depreciation is generally an overhead expense except when the asset only benefits one cost objective.

The following functions can be charged as either direct or as production overhead/shop indirect: First line supervision, production testing petroleum /oil /lubricants (POL), Test/Inspections/Verification and Overtime/Holiday Premium.

Unless otherwise stated in the RFP, the above functions may be charged as direct for all portions of the proposal that calls for a level-of-effort or charging a rate per hour for unpriced over and above work.

Over and Above Work (Within Scope Changes)

Competitive cost proposals are based on the specific Statement of Work (SOW) in the solicitation document. Any work requirement identified subsequent to the award of a workload is considered to be over and above workload. Any costs associated with over and above work are accounted for separately and must be available for audit.

Changes to the Statement of Work (SOW)

When the customer changes the specification of work or if during the course of the work unexpected conditions are encountered, the performing activity contacts the customer and they jointly agree on the appropriate action. If the customer agrees that the additional work is necessary, the customer is required to fund the additional work. Statement of work changes after award are separately justified and negotiated with the requiring activity. These SOW changes are funded and included in the award document by modification.

Reporting and Audit. All costs and revenue applicable to competitive workload are separately reported and auditable.

SUMMARY OF COST ELEMENTS USED IN RATE DEVELOPMENT

The following provides a brief summary and definition of typical cost elements. A comprehensive listing can be found in an attachment to this appendix.

DIRECT COST	PRODUCTION EXPENSE	OVERHEAD (G&A)
1. Labor	1. Labor	1. Labor
2. Material	2. Material	2. Material
	3. TAD/Travel	3. TAD/Travel

COST ELEMENTS DESCRIBED

Direct Cost

Costs applied to the customer through established rates for direct labor and actual material costs. Below is a brief description of direct costs.

1. **DIRECT COST LABOR** rate is established based on the approved rate of pay plus acceleration and estimated pay-raises. Direct labor is the personnel cost involved directly on a customers job. The labor cost includes leave and fringe benefits. Fringe benefits include: Medicare, FICA, health insurance, life insurance, FERS, TSP, and CSRA. The labor costs also include a night differential, hazardous duty, etc. Leave includes: annual, sick, holiday, jury, etc.
2. **DIRECT COST MATERIAL** is the cost of material consumed on a customers job. Direct material can be from within the DoD supply system or from a commercial vendor.

Production Expense

Production Expense, costs applied to the customer order through an established rate by cost center. Below is a brief description of production expenses.

1. **PRODUCTION EXPENSE LABOR** is the cost of personnel involved in supporting the direct labor effort. The cost breakdown is the same as direct labor.
2. **PRODUCTION EXPENSE MATERIAL** is the cost of material used to support the direct labor effort but cannot be identified to an individual customer.
3. **PRODUCTION EXPENSE TAD/TRAVEL** is the cost of transportation (air, bus, car, etc.), per diem (food, lodging and incidentals), and tuition. These costs include attending conferences or training.

Overhead (G&A)

Overhead (G&A), is costs applied to the customer through an established G&A rate. Below is a brief description of overhead costs.

1. **G&A LABOR** is the personnel cost that is so general in nature that it cannot be identified to a customers job. The cost breakdown is the same as direct labor. The types of labor involved include: personnel administration, production and

material control, financial management, facilities support, security, safety, environmental, etc.

2. **G&A MATERIAL** is the cost of material that is so general in nature that it cannot be identified to a customer's job. This type of material could include copy paper, pens, paper clips, etc.
3. **G&A TAD/TRAVEL** is made up of the same type of costs shown for production expense TAD/Travel.
4. **G&A BASE SUPPORT** is the cost of various services received from the host activity. These services include maintenance of equipment and facilities, personnel administrative support, data processing support, material receiving, processing, issuing and procurement, utilities, fire protection, etc.
5. **G&A DEPRECIATION** is the allocation of the benefit derived from equipment and facilities. Equipment with a unit cost of more than \$25,000 is depreciated.
6. **G&A MAJOR MAINTENANCE** is the cost of maintenance of facilities where project cost is more than \$25,000.
7. **G&A Service contracts** are the cost of contracts for the maintenance of office machines such as calculators, information systems, printing, accounting, disbursing, plant property, headquarters element, etc.
8. **G&A Environmental costs** include the costs of waste minimization, removal of waste products, fines, permits, etc.
9. **G&A FECA** is the annual reimbursement of the cost of worker's compensation paid during a previous period.
10. **G&A MILITARY LABOR** is the cost of military personnel assigned to overhead positions.

PUBLIC-PRIVATE RATE AND PRICE DIFFERENCES

The following section resulted from a detailed comparison between public depot costing methodologies and private industry "financial disclosure statements".

Rate Section

Public depot maintenance activities direct labor cost elements consist of the compensation cost, accelerated by expected leave and fringe benefits as adjusted for anticipated overtime, that benefit a particular job. The non-labor rate cost elements

consist of material or other direct cost items, such as contractual services, depreciation, transportation, travel and other items that benefit a particular job as described in a statement of work. Individual categories are contained in an Attachment, titled *Summary of Price and Expenses* (for use by public depots). Private depot maintenance activities direct labor and non-labor rate cost elements are similar to those in the public sector examples are also contained in an Attachment.

Public depot maintenance activities indirect labor and indirect non-labor rates contain those cost elements such as compensation cost accelerated by expected leave and fringe benefits as adjusted for anticipated overtime, that are assigned to indirect cost pools. The non-labor rate cost elements consist of material or other cost items, such as contractual services, depreciation, transportation, travel and other items that are assigned to indirect cost pools for subsequent allocation to particular job orders or other indirect cost pools in compliance with the statement of work. Any cost incurred by a production cost center that is not a direct cost are classified as production overhead expenses. Examples include; supervision, clerical support, pre-expended bins, shop clean-up, quality assurance, backrobbing and cannibalization, training, and calibration of shop equipment. Individual categories are contained in an Attachment, titled *Summary of Price, and Expenses* (for use by public depots). For private industry classification of costs is variable depending on company policy.

The Public depot maintenance activities G&A expenses are those that are not attributed to a specific product or a specific shop/cost center, rather these costs benefit the entire depot activity. In general the G&A cost elements are comprised of labor wage rate that is accelerated by expected leave and fringe benefit requirements. Specifically, these elements include the commanding officer and his staff, public affairs, comptroller, legal, and equal employment opportunity staff expenses and the automatic data processing centers. The portion of the costs that are attributed to a production cost center are then transferred to those production cost centers. The portion of the G&A cost centers expenses that do not support a production center are those that support the G&A efforts and are in turn allocated to the work performed in the depots by a reasonable and consistent allocation method. The allocation method can be a combination of machine run time, number of reports produced, or any other reasonable basis. Additional individual categories are contained in an Attachment, titled *Summary of Price, and Expenses* (for use by public depots). The private industry G&A expenses were extracted from the disclosure statement submitted as a part of this study.

Public maintenance depot activities do not include a rate of return (projected profit) item in their bid proposals. Private depot maintenance activities utilize a formula with various sub-components to develop a return on investment factor which is included in the bid proposal. The rate of return percentage varies depending upon the particular request for proposal and the depots desire to compete for the contract. Rates of return greater than ten percent have been identified, however rates of return by major end items was not provided by the participants from private industry. It is

conceivable that a zero rate of return could be used if it would enable a depot to maintain a skill base for the future, with the expectation of obtaining additional work.

Public depot maintenance activities are governmental entities as such they are not subject to income tax regulations or provisions. As a result, they do not make a distinction between "book" and "tax purposes" for operating losses. In general the public depot maintenance activities are required by law to operate at a zero profit. If a loss is incurred, then recoupment is required in the subsequent years in order to break even over a period of time. Within the overall Defense Maintenance Business Area (DMBA), a competitive workload could experience a loss, but other workloads could experience gains, and in the overall perspective the DBMA would break even. However, the DoD Cost Comparability Handbook does not allow for the inclusion of previous operating losses in subsequent competitive bid proposals. On the other hand, Private depot maintenance activities are able to take advantage of operating loss provisions by carrying back, for three years, operating losses against their prior year Federal income tax liability and obtain a refund of prior year tax payments, or they can carry forward the operating loss, for fifteen years, against subsequent years operating income, thereby reducing subsequent years tax liabilities. In practice within those private depot maintenance activities in which Federal income tax is a factor in the Rate of Return item, the affect of an operating loss in subsequent years could be translated as a reduction in the factor, because the operating loss is perceived as a credit against future Federal income taxes, and less funds would have to be recovered. Thus an operating loss could reduce the cost of future bids.

Price Section

The public depot maintenance activities, use a single method to calculate prices. This method establishes a price that is expected to recover operating costs. A comprehensive unit cost is developed by estimating the actual production hours required to accomplish the work in the statement of work, then multiplying the hours by the direct labor and overhead rates developed. In summary, public depot maintenance activity price is synonymous with workload costs. The private depot maintenance activities develop a forward pricing rate agreement that specifies a stated hourly rate. The rate is multiplied by the hours of work required in the statement of work to determine the fixed price contract.

Most of the Public depot maintenance activities perform cost realism checks on their respective bid proposals. The check is performed by technical experts, contracting officers or an internal contract pricing organization, and the methodology consists of a comparison of historical and current data, consisting of hours, material and rates in the statement of work, in order to validate what the bid should cost. Additionally, in most cases, the DCAA performs the cost realism check when the proposal is offered up for public/private competition. Within the private depot maintenance community, an example of the methodology consists of a small CORE business operations group

supplemented by technical experts obtained from the production facilities where the proposal is being evaluated. In general the process consists of a review of the estimate of the hours required to perform the work as required in the statement of work. The DCAA previously approved the hourly rate in the forward pricing rate agreement for fixed price contracts.

Public Depot Maintenance activities cost realism calculations are subject to either DCAA or contracting officer review. Private depot maintenance activities rates are reviewed and approved by DCAA, as proposed in the forward rate pricing agreement. Although the calculation itself is not subject to DCAA review, a CORE business operations group reviews the proposal as mentioned in the preceding paragraph. However, DCAA performs a post award audit and examines the indirect cost in order to determine if it is allowable or not. In summary both the public and the private depot perform cost realism checks.

Risk Assessment

Risk analyzes are performed by both the private and public sectors as a means to statistically categorize proposals as either reasonable or unreasonable. They provide a predictable yardstick to evaluate the uncertainty of proposal bid prices but not the accuracy of the proposal itself. An effective evaluation assesses the variables of the proposal and the process that developed the proposal. By use of probability theory and development of a range of estimates around the most likely value, a confidence interval can be associated with each estimate. Typical uncertainties include statement of work, schedule, labor efficiency, inflation, escalation, sub-contractor and procurement performance, rates, etc. Key factors in performing a successful risk assessment include in-depth understanding of the statement of work, evaluation of available data and assessment of its accuracy and stability. Although used by both public and private activities, the statistical advantage in performing a reliable risk analysis lies with the private activity, because it usually has a larger historical and active competition base from which the analysis can be conducted.

SUMMARY OF PUBLIC/PRIVATE SECTOR RATE AND PRICE METHODOLOGIES

Similar summary processes are followed by both the public and private sectors to set rates and prices.

- Costs estimated for direct, indirect and general overhead expenses
- All labor and material costs estimated
- Costs per direct labor hour (DLH) developed

Work specifications and requirements determined for all bidders. Bidders determine:

- DLH's estimated on:
 - Historical experience
 - OEM's original maintenance requirement
 - Technical knowledge of work required
- Costs applied against estimated DLHs
- Direct, indirect and overhead cost rates, or
- Total cost per DLH rate

Risk analysis is completed to verify validity of estimates

- Private sector:
 - Must determine rate of return desired
 - Balance bid with competitiveness
 - Must generate a profit
- Public sector depots focus on:
 - Break even
 - Cost minimization
 - Avoiding losses

Bid price determined by analysis of RFP SOW workload and the application of developed rates against that workload.

Final Price is then computed by adding cost comparability adjustments made in accordance with the DoD Cost Comparability Handbook.

COST & EXPENSE ELEMENTS IN PUBLIC DEPOTS

Military Personnel Compensation

Officer Composite - Military Rates
Enlisted Composite - Military Rates

Total Military - Personnel Compensation

Civilian Personnel Compensation

Executive, General, & Special Schedule
Wage Board
Foreign National Direct Hire (FNDH)
Civilian Mariners (MSC only) [NAVSEA]
Separation Liability (FNDH)
Benefits to Former Employees
Disability Compensation
Other Civilian Compensation

Total Civilian - Personnel Compensation

Travel

Per Diem
Other Travel Costs
MAC Passenger (Fund)
Leased Vehicle

Total Travel

Material, Equipment, & Supplies (for Internal Operations)

Fuel Purchases (From - Supply Management)
Material & Supplies - Procured from DoD Sources
(excluding Fuel)
[aka] Army Managed Supplies & Material (Fund)
Navy Managed Supplies & Materials (Fund)
Noncapitalized Equipment - Procured from DoD Sources
Air Force Managed Supplies & Materials (Fund)
DLA Managed Supplies & Material (Fund)
GSA Managed Supply - Purchases

Locally Procured DBOF Managed Supplies & Materials
GSA Managed Purchases - of Noncapitalized Equipment
Locally Purchased Supplies & Materials (Other than from
Supply Management)

Locally Purchased Noncapitalized - Equipment
Commercial Purchases of Supplies & Materials

Army Managed Equipment (Fund)
Navy Managed Equipment (Fund)
Air Force Managed Equipment (Fund)
DLA Managed Equipment (Fund)
GSA Managed Equipment
Commercial Purchases of Equipment

Ordnance - Armament Command
Army Depot System Command (Other)
Naval Aviation Depots
Naval Publications & Printing Services
Communications Service (DISA)

Materials & Supplies
Equipment

**Total Material, Equipment & Supplies (internal
operations)**

Stock Fund Purchases

Navy Managed Items Stock Fund Purchases
USMC Managed Stock Fund Purchases
DLA Managed Stock Fund Purchases * (sub total account)
GSA Managed Stock Fund Purchases *
Army Managed Stock Fund Purchases
USAF Managed Stock Fund Purchases

Total Stock Fund Purchases

Fuel

Fuel

Total Fuel

Industrial Fund Purchases

Naval Air Warfare Center
Naval Surface Warfare Center
Naval Undersea Warfare Center
Naval Aviation Depot
Naval CC Ocean Surveillance
Data Automation Center
MSC NFAF
MSC AP/FSS
MSC SMS
MSC Composite Cargo
Naval Research Laboratory
Naval Ordnance Facility
Navy Publications A
Public Works Center
PWCS - Other Services
Naval Shipyards
Naval Civil Engineering
USMC Depot Maintenance
Defense Clothing
Defense Communications
Army Armament Command
Army - Depot Maintenance
Army Depot Supply
Army Missile Command
Air Force - Airlift
Defense Finance and and Accounting Services
Air Force - Depot Maintenance
Air Force - Laundry
Air Force - Real Property Maintenance Activity - Utility
Air Force - Real Property Maintenance Activity - Public
Works
Cost Reimbursable Purchases

Total Military - Industrial Fund Purchases

Transportation

MAC - CARGO (Fund)

MAC SAAM (Fund)
MSC Cargo (Fund)
MTMC Port Handling
Other Transportation

MAC - Cargo (IF)
MAC SAAM (IF)
MSC Cargo (IF)
MTMC Port Handling (IF)
Other Transportation

Total Transportation

Travel

Per Diem
Other Travel Costs
MAC Passenger (Fund)
Leased Vehicle

Total Travel

Other Purchases

Foreign National Indirect Hire (FNIH)
Separation Liability (FNIH)
SLUC (GSA Leases)
Purchases Utilities (Non-Fund)
Purchased Communications (Non-Fund)
Rents and Leases
Disability Compensation
Printing and Reproduction (Non-Fund)
Equipment Maintenance by Contract
Facility maintenance by Contract
Aircraft Rework Contract
Contract Studies & Analysis
Professional & Management Services by Contract
Contract Engineering & Technical Services (CETS)

Other Engineering Service & Support

Other Contracts

Other Costs

Communications

ADP Services/Support

Equipment Maintenance

Real Property Maintenance

Ship Maintenance

Service Craft Maintenance

Aircraft Rework

Other Depot Maintenance

Contract Consultants

Contract Studies & Analysis

Professional & Management Services

Contract Engineer Technical Services

Federally Funded R&D Centers

Information Technology Systems

Systems Engineering

Other Engineering Support

Training/Tuition

Lease & Charter - Aircraft & Vessels

Other Contracts

Other Travel & Transportation Service

Airport/Seaport Tax (MSC only)

Common Carrier Mail (MSC only)

Other Costs

Total Other Purchases

Funded Depreciation

Major Maintenance & Repair Expense

Equipment, except ADPE & Telecom Equipment

ADPE and Telecom Resources

Software Development

Minor Construction

Management Improvement Initiatives

Major Construction (MILCON)

Leasehold Improvements

Depreciation - Equipment

**Depreciation - Minor Construction
Depreciation - Management Systems
Cost of Purchases Assets
Interdepartmental Transfers**

Total Funded Depreciation

SUB-TOTAL ALL EXPENSES

LESS: Manufactured for Inventory

TOTAL COST FOR THE PERIOD

TYPICAL COST & EXPENSE ELEMENTS IN PRIVATE DEPOTS

LISTING OF COST ELEMENT ITEMS OR COST CENTER/POOL OBTAINED FROM SEVERAL PRIVATE INDUSTRY DISCLOSURE STATEMENTS (note the various entities utilize various combinations of the following elements or cost centers)

DIRECT MATERIALS:

cash discounts
freight-in
inventory adjustments
purchasing

DIRECT LABOR:

health insurance
holiday pay
overtime premium pay
pension costs
shift premium pay

MISCELLANEOUS:

design engineering
computer operation (in house)
contract administration
line (or product) inspection
pre-production cost and start-up cost
production shop supervision
rework costs
royalties
special test equipment
subcontract costs
warranty costs

STAFF:

executive management
division directors & management staff
secretarial duties
business planning
legal & patents
public relations

PERSONNEL:

wage & salary administration
recreational activities
employee relations
management development
labor relations
educational services
plant protection
office services

ACCOUNTING, FINANCE & PLANNING:

general accounting
cost accounting
account payable
payroll, taxes and insurance
overhead budget planning
finance analysis
financial forecasting
finance and audit

DATA MANAGEMENT:

configuration baseline control
specification engineering control
data management
contract technical data bank
contract technical requirements proposal
value engineering change proposal admin.

CONTRACTS:

statement of work and or contracts
data requirement list
value engineering change proposals
proposal activity

PROPERTY MANAGEMENT:

contract close-out administration
property administration

MARKETING:

marketing analysis & operations analysts
marketing

MANAGEMENT INFORMATION SYSTEMS:

internal planning control
customer unique, analysis & reports
management systems & studies
management & supervision

PROGRAM MANAGEMENT:

mission program management reporting
mission area program management
engineering task leaders
proposal activity

PROGRAMS:

operations & systems analysis
advanced concepts
international initiatives

TRAINING:

processes
systems

FINANCE:

performance measurement system
life cycle cost
value engineering studies
cost management systems operation
budget baselines
cost reporting account structure
contract close-outs
final price predetermination
negotiations

MATERIAL SYSTEMS:

Government Property Management
equipment accountability
Supplier capability surveys & buying
inspection and delivery requirements
Contract close-out administration
detail cost studies
engineering change activity
change board
cost & price evaluation
surveys & evaluations supporting
supplier evaluations

site activation - procurement
overhead, budget planning & control

SUPPORT:

Field Operations
modification and depot services
logistics support
logistics engineering
management & supervision
proposal activity

RESEARCH AND ENGINEERING:

design engineering
value engineering
propulsion engineering
materials engineering
electronics engineering
electrical engineering
mechanical engineering
confirmation/verification testing
development engineering & testing
qualification testing
acceptance testing
data analysis
systems documentation
inspection procedures development
design support
program scheduling
test operations
product support - engineering

PRODUCT ASSURANCE:

quality dept. overall policies test data
analysis
workmanship standards for products
engineering process specifications
production test plans
production test procedures
calibration of equipment & tools
acceptance & test inspection
hardware and systems review
subcontractor/supplier control

FABRICATION OPERATIONS FINAL ASSEMBLY MANUFACTURING TEST/ QUALITY INSPECTIONS:
program technical support
production
corrective action control
change board activity
planning board activity
manufacturing directives
make-or-buy committee support
product assurance

PLANNING AND CONTROL:
program product control
program planning & scheduling
hardware requirements analysis
fabrication control
inventory requirements and controls

TOOLING ENGINEERING DESIGN:
tool design
tool pre-planning
tooling control
tool fabrication & modification
numerically controlled machine programming
tool scheduling, development, proving & set-up
functional test and process planning

INDUSTRIAL ENGINEERING:
monitor, evaluate & update work standards
standard hours - process plans
machine load controls
process controls
systems & procedures
work measurement - area engineering

FACILITIES:
facilities equipment controls
facilities engineering
facilities planning
maintenance scheduling
capitol facilities
facilities requirements & acquisitions

OTHER MISC. COSTS:

dues & subscriptions
incentive compensation
hourly sick leave
hourly pension
salary pension
holidays, paid
taxes - real & personal
taxes - FICA, U.I.C. and payroll
taxes - sales, use, income, etc.
hourly and salary indirect - labor
insurance - group
vacation expenses
termination pay (severance) idle time

OTHER DIRECT & INDIRECT FUNCTIONS:

facilities services
vendor files
purchasing/buyers - local
production planning and scheduling
production shipping and spares control
estimating for existing contracts
estimating new business
contract status evaluation
quality data collection
government property mgt.

DEPOT MAINTENANCE CUSTOMER ORDERS

As of 18 MARCH 1994

SERVICE	FY90	FY91	FY92	FY93	FY94	TOTAL
ARMY						
DBOF DEPOTS	1,366.10	1,391.70	1,550.40	1,338.70	1,264.40	6,911.30 56.4%
NATIONAL MTN CONTRACTS	708.00	932.00	760.00	578.00	605.00	3,583.00 29.2%
MODS & UPGRADES MAN KITS	121.70	281.90	148.30	95.40	173.00	820.30 6.7%
R&D IN PRIVATES SECT	42.30	51.20	42.40	41.90	39.60	217.40 1.8%
CONTR PROV LOGISTICS	108.30	146.30	177.80	154.40	136.70	723.50 5.9%
SUBTOTAL	2,346.40	2,803.10	2,678.90	2,208.40	2,218.70	12,255.50 100.0%
NAVAIR						
DBOF NADEPS	1,720.00	1,799.80	1,704.40	1,799.30	1,712.30	8,735.80 67.3%
PRIVATE MAINTENANCE	244.10	383.00	343.80	167.60	176.60	1,315.10 10.1%
PRIVATE MODS	405.00	145.80	99.10	190.00	74.00	913.90 7.0%
ICP COMMERCIAL	480.90	411.90	400.30	329.20	387.80	2,010.10 15.5%
SUBTOTAL	2,850.00	2,740.50	2,547.60	2,486.10	2,350.70	12,974.90 100.0%
NAVSEA						
DBOF SHIPYARDS	3,840.40	3,984.30	4,201.50	4,021.50	3,896.20	19,943.90 67.0%
PRIVATE SHIPYARDS	1,551.00	1,666.00	1,652.00	1,304.00	1,008.00	7,181.00 24.1%
OTHER NAVSEA ORGANIC	222.80	240.50	219.50	226.90	190.10	1,099.80 3.7%
OTHER CONTRACT	165.70	168.70	156.50	162.50	142.00	795.40 2.7%
SPCC COMMERCIAL	147.00	163.00	187.00	116.00	118.80	731.80 2.5%
SUBTOTAL	5,926.90	6,222.50	6,416.50	5,830.90	5,355.10	29,751.90 100.0%
MARINE CORPS						
DBOF DEPOTS	120.20	105.70	228.20	210.70	72.50	737.30 81.8%
PRIVATE MTN CONTRACTS	0.00	0.00	0.00	0.00	0.00	0.00 0.0%
COMMERCIAL KIT	3.90	6.60	5.20	2.00	0.90	18.60 2.1%
MANUFACTURE						
RDT&E MODS COMMERCIAL	18.30	24.40	21.70	19.50	11.30	95.20 10.6%
CONTRACT PROV LOGISTICS	9.30	12.30	18.30	9.00	1.20	50.10 5.6%
SUBTOTAL	151.70	149.00	273.40	241.20	85.90	901.20 100.0%
AIR FORCE						
DBOF DEPOTS	2,331.90	2,446.70	2,553.20	2,978.50	3,142.20	13,452.50 71.2%
PRIVATE MTN CONTRACTS	850.90	781.10	779.20	394.10	400.90	3,206.20 17.0%
PROCUREMENT COMMERCIAL	37.40	85.50	225.90	102.20	54.00	505.00 2.7%
RDT&E MODS COMMERCIAL	26.00	35.00	14.80	2.40	6.60	84.80 0.4%
ICP COMMERCIAL	344.60	231.50	426.30	310.20	338.00	1,650.60 8.7%
SUBTOTAL	3,590.80	3,579.80	3,999.40	3,787.40	3,941.70	18,899.10 100.0%
DOD TOTALS						
DBOF DEPOTS	9,601.40	9,968.70	10,457.20	10,575.60	10,277.70	50,880.60 68.0%
PRIVATE MTN CONTRACTS	3,354.00	3,762.10	3,535.00	2,443.70	2,190.50	15,285.30 20.4%
PROCUREMENT COMMERCIAL	1,706.20	1,494.90	1,648.60	1,307.50	1,288.50	7,445.70 10.0%
CLS & OTHER COMMERCIAL	204.20	269.20	275.00	227.20	195.40	1,171.00 1.6%
TOTAL	14,865.80	15,494.90	15,915.80	14,554.00	13,952.10	74,782.60 100.0%

See Notes

NOTES:

- A. In Army DESCOM Depots funding for supply, logistics support, base operations and other non-maintenance related functions has not been included.
- B. Only the depot maintenance funding for Naval Weapon Stations and Naval Warfare Centers is included in the figures listed above. The remaining funding for these businesses is not normally considered depot maintenance (either organic or commercial).
- C. Army DBOF Depot Maintenance - Ordnance funding is not included in the Army totals above.
- D. These additional DBOF funds not included above are listed below.

	FY90	FY91	FY92	FY93	FY94
TOTAL FROM ABOVE	14,865.80	15,494.90	15,915.80	14,554.00	13,952.10
OTHER DESCOM	700.00	705.90	471.80	621.50	409.60
ARMY ORDNANCE	450.30	547.30	630.00	619.00	612.80
OTHER NAVAL ORDNANCE	540.60	622.20	676.60	660.10	562.20
TOTAL	16,556.70	17,370.30	17,694.20	16,454.60	15,536.70

APPENDIX I

DISCUSSION OF WORKLOAD BALANCING ISSUES

TASK 7: A discussion of the issues involved in determining the balance between the amount of depot-level maintenance workloads assigned for performance by employees of the Department of Defense and the amount of depot-level Maintenance workloads assigned for performance by non-Federal Government personnel, including the preservation of surge capabilities and essential industrial base capabilities needed in the event of mobilization.

APRIL 1994

**DEFENSE SCIENCE BOARD
DEPOT MAINTENANCE MANAGEMENT TASK FORCE**

TASK 7: A discussion of the issues involved in determining the balance between the amount of depot-level maintenance workloads assigned for performance by employees of the Department of Defense and the amount of depot-level maintenance workloads assigned for performance by non-federal government personnel, including the preservation of surge capabilities and essential industrial base capabilities needed in the event of mobilization.

OVERVIEW

Industrial products and services purchased by the Department of Defense fall within one of two general categories:

- Those associated with weapon system design and manufacture, and
- Those associated with weapon system support (Attachment A).

Most weapons design, and virtually all manufacturing, is accomplished by private industry; there is no issue of "work balance" in this area.

Industrial support, on the other hand, is purchased from both public and private sector suppliers, and there *are* issues involved in the equitable distribution of this workload. Service Secretaries must ensure that the combat commanders' logistic support needs are met, while also accommodating the needs and desires of those public and private industrial facilities supplying the products and services which collectively comprise "depot maintenance." The process by which these decisions are made is influenced by policy and public law, both of which are subject to interpretation. It is not surprising, therefore, that opinions differ within the Defense Department, and between DoD and industry. The Task Force identified five substantive issues which currently affect the distribution of DoD depot maintenance workload between the public and private sectors of the defense industrial base:

1. CORE Policy
2. Commercial Industrial Base Viability Concerns
3. Competition Policy
4. Surge and Mobilization Considerations
5. Congressional Guidance.

Although all of the issues are interrelated, each is treated below as a separate subject.

DISCUSSION

Issue 1. CORE Policy -- The role of DoD's CORE depot maintenance policy in determining workload balance.

Title 10, United States Code, requires the Secretary of Defense to maintain a logistics capability to ensure a ready and controlled source of technical competence and resources necessary for effective and timely response to mobilization, national defense contingency situations and other emergency requirements, and further specifies that the Secretary shall identify those logistics activities that are necessary to achieve this capability. The DoD CORE methodology is currently the basic process for determining the minimum depot maintenance workload that must be performed in organic depots and shipyards to meet Title 10 requirements.

The Task Force found the basic DoD CORE methodology to be sound and appropriate. Since the DoD CORE policy and methodology are explored in great detail in Appendix G, only a summary is presented here.

The concept of CORE depot maintenance requirements is explained in a 15 November 1993 memorandum entitled *Policy for Maintaining CORE Depot Maintenance Capability* issued by the Deputy Under Secretary of Defense for Logistics. The memorandum describes CORE in these terms:

Depot maintenance CORE is the capability maintained within organic Defense depots to meet readiness and sustainability requirements of the weapon systems that support the JCS contingency scenario(s). CORE exists to minimize operational risks and to guarantee required readiness for these weapon systems. CORE depot maintenance capabilities will comprise only the minimum facilities, equipment and skilled personnel necessary to ensure a ready and controlled source of required technical competence. Depot maintenance for the designated weapon systems will be the primary workloads assigned to DoD depots to support CORE depot maintenance capabilities.

The Task Force endorses this definition of CORE, both in terms of the basic concept and in terms of the specific features ascribed to the concept.

The workload distribution issues surrounding CORE concern (a) the process by which a DoD depot is selected to do CORE work (and, thus, to be responsible for the capabilities which are preserved by accomplishing the work), and (b) the process by which *non-CORE* workload is made available to government and industry suppliers.

Although the first CORE issue involves only intra-Departmental depot workload, it has an affect on the policy which will ultimately make work available to

private industry. Specifically, the first issue concerns whether CORE workload should be distributed by the Service Secretary or the Secretary of Defense.

The Task Force believes that readiness is the primary reason for maintaining organic depots. Readiness is a Service Secretary responsibility, therefore the Task Force majority position is that CORE should be Service specific¹. Having said this, the Task Force also believes that each Service Secretary should aggressively seek opportunities to interservice CORE workload for common equipment; when two Services operate the same weapon, existing depot maintenance support should be consolidated at the earliest opportunity using established DoD Depot Maintenance Interservicing Agreement (DMISA) procedures. No Service should establish new capability for a weapon or component currently supported by another Service!

Finally, the Task Force (less the Air Force) concludes that, since CORE is Service specific, with Service Secretaries exercising their prerogative to interservice work through a DMISA whenever possible, there is no requirement for expensive and often contentious public-public competition for CORE work. Moreover, to the extent that the Services are successful in divesting themselves of unneeded infrastructure, there will cease to be excess capacity in the Service's depots, and thus *no room* for another Service's CORE workload.

The second CORE-related issue involves the degree to which public depots should be limited in performing work that is not required to maintain CORE capabilities (i.e., non-CORE work). At the heart of this issue is the role of public-private competition. All members of the Task Force, except the Air Force, take the position that public depots should target their size to the CORE workload requirement. The Task Force, less the Air Force, believes that the dramatic savings which each Service must achieve can only be met by eliminating the fixed infrastructure costs associated with excess depot capacity². As noted above, since Service depots will downsize to Service CORE, they will no longer have significant excess capacity, and will, therefore, not be in a position to take on additional workload. For this and other reasons discussed below, the depots should discontinue all public-private competitions for non-CORE work, except as approved by the Defense Depot Maintenance Council.

¹ The Air Force did not subscribe to Service specific CORE. Their position is that they support the policy of DoD CORE vice Service CORE – and that as much workload as is economically justified should be interserviced at the most cost efficient DoD depot regardless of which Service operates the depot. See Appendix G for a more detailed discussion of this issue.

² One of the most important features of the CORE policy is the workload sizing methodology which was designed to help the Services select from all potential workload the *minimum amount* required to protect CORE capabilities.

Issue 2. Commercial Industrial Base Viability Concerns -- The role of DoD's industrial base concerns in determining depot workload balance.

Defense depot policy makers are rightly concerned about the need to preserve CORE depot maintenance capabilities essential to the readiness and sustainment of key weapon systems. Without such capabilities it would be nearly impossible to successfully engage in a major regional contingency -- not to mention the two near-simultaneous contingencies that provided the baseline for the Bottom-Up Review. However, maintenance capabilities are not the only weapons-related competencies that the Defense Department needs to preserve. It also needs to maintain the ability to design, develop, test and produce new weapons. This requirement was underscored by then-Deputy Secretary of Defense William Perry in testimony before the Senate Appropriations Committee on May 20, 1993:

- Historically, U.S. manufacturers designed and built weapon systems and military depots and shipyards managed the repair and overhaul of those weapons systems. As the requirement for manufacture of new weapon systems grows smaller with the changing world, manufacturing capacity will be downsized as a matter of economic necessity. The Department is interested in maintaining those development, design and manufacturing capabilities that cannot be easily obtained from the existing commercial base, military depots or laboratories. Clearly, government depots and laboratories play a very important role, but they do not possess the overall capabilities for development and production of entire systems.

DoD must take care to protect critical military design and production capabilities during periods of reduced tension, such as today. The absence of an urgent military threat, and consequent reduction in weapons procurement, creates economic pressures which force the defense industrial base to shrink. That process is already well advanced in the United States. Military procurement budgets have been cut in real terms by two-thirds since the mid-1980s, and industry is rapidly downsizing. By the late 1990s, the United States will have ceased new production of heavy armored vehicles, concentrated submarine and aircraft carrier production at single shipyards, and cut the number of fixed-wing military aircraft integrators to two. The number of subtier suppliers in the aerospace industry is expected to fall by 60-70% during the 1990s, and the private-sector ammunition industry will contract by 70-80%.

In the absence of major external threats, these cuts are probably unavoidable. However, new threats eventually will arise, and it is essential that an adequate industrial base for designing, developing and producing military systems be preserved. The Clinton Administration's plan for achieving this goal consists of a number of innovative measures, including commercial-military integration, acquisition reform and consolidation of militarily-unique capabilities at a limited number of still-viable sites. What distinguishes the present administration's plan from that of its predecessors

is that it represents an *integrated* strategy for dealing with a wide range of economic and security concerns. By carefully thinking through the dynamics of technological development, military production and economic competitiveness, the Clinton Administration has crafted a unified framework for reconciling a number of competing objectives.

Unfortunately, much of the debate over depot maintenance policies has proceeded as if maintenance had little relevance to the administration's broader goals. Despite assertions that military industrial activities should, to the greatest degree possible, be integrated into the commercial economy, some proponents of the status quo continue to argue for preservation of extensive public-sector maintenance capabilities. There has been a general failure to consider how non-CORE activities currently conducted in government depots could contribute to the preservation of militarily-unique design and production capabilities in the private sector. For example:

- Awarding maintenance work that involves important, militarily-unique design and production capabilities to the lowest bidder ignores the costs potentially incurred by the Department of Defense if such capabilities are lost and later must be reconstituted.
- Continued performance of non-essential maintenance functions by federal employees potentially deprives the commercial economy of technical skills and processes that may be relevant to national competitiveness.
- Expansion of some depots into sophisticated modification and upgrade programs deprives essential private-sector manufacturers of their traditional business base at precisely the time when cutbacks in systems procurement have weakened their ability to survive.

The Task Force feels that it is advisable to integrate DoD's depot maintenance policy into the Department's long-range plan for preserving the defense industrial base. What is needed is a coherent approach to the Services' weapons requirements that encompasses all phases of the product life cycle -- design, development, production, maintenance and modification. The Services have to retain CORE depot maintenance capabilities that are essential to readiness and sustainability. But they can and should identify those activities that do not need to be performed by government employees, and that can be outsourced. The Task Force believes that the Services, in conjunction with industry, should prepare an analysis of depot maintenance activities which can usefully be placed in the private sector to help preserve critical design, development and production capabilities in the defense industrial base. The Task Force is convinced that most aspects of weapon system modification, upgrade and conversion activity satisfy these criteria, therefore, unless there is an overriding security or readiness reason, the Task Force believes that the Services should outsource all of this work as soon as possible.

Issue 3. Competition Policy -- The role of DoD's competition policy in determining workload balance.

The DoD CORE policy is silent regarding the disposition of non-CORE workload, however *all of the Service and industry members of the Task Force unanimously support competition as the preferred distribution tool*. All of the Services and industry members, except for the Air Force, believe that this competition should be private-private, not public private.

Competition is the traditional process by which free markets determine the allocation of goods and services. According to conventional market theory, the unfettered interplay of forces of supply and demand produces the fairest and most efficient economic outcomes. In recent years, DoD has stressed the importance of infusing the depots with the benefits of private sector business management practices, including increased competition for workload.

Whether depot competitions with industry can be considered successful, and whether public-private competitions should be continued in the future depends on whether these competitions are considered "meaningful" in a true economic sense. Conventional market theory describes competition as occurring when a multiplicity of buyers and sellers freely compete on equal terms. Clearly, that situation does not occur in the defense business because the government is the sole buyer -- the defense market is a monopsony. This market distortion is accepted as an unavoidable requirement of national sovereignty and security, so most discussion of "meaningful competition" in the context of defense workload focuses on the rivalry among suppliers for federal funds.

Theory and history both suggest that such rivalry can be (and generally is) harnessed to drive down cost. Competition among commercial suppliers (private-private competition) is considered "meaningful" when market forces work and the customer can get what he needs at the lowest possible cost. When the theory was tested using public-private competitions, initial results were encouraging. The short-term results seemed to justify the effort and expense involved. However, setting aside the contentious question whether such competitions are fairly conducted, there is serious concern that public-private competitions for depot maintenance workload are *not* "meaningful" competitions, and that, in the long-term, such competitions may represent bad policy.

After initial experiences, the defense depots that competed successfully quickly found that they were given no meaningful financial rewards, and offered no real incentives to repeat their achievement (i.e., no "profits" were returned to those involved in winning the competition; no "savings" were set aside to reinvest in improved plant and equipment, etc.). No evidence could be found that suggested market forces were at

work. Perhaps even worse, the unsuccessful depots quickly realized that there were no negative repercussions to competitive failure -- no managers lost their jobs and no depot or shipyard went out of business ("efficiency" and "competitiveness" are not criteria taken into consideration by the Base Closure and Realignment Commission -- many of the depots which have been closed had good competition records). Again, market forces were not working. For these and other reasons, there is justifiable skepticism over the wisdom of calling public-private depot competitions "meaningful". If they are not meaningful, then they cannot be relied upon to produce the desirable results expected in the economic model.

Besides procedural questions, the Task Force members shared a concern over the chronic effects of a policy that asks private companies to aggressively compete with their major (sometimes only) customer. It was evident from Task Force discussions that friction, and even suppressed hostility, was a not uncommon byproduct of hard fought public-private depot competitions. To the extent that the anecdotal evidence is true, these competitions may be undermining the government-industry teamwork so critical to the nation's defense. Philosophically, the Task Force majority subscribe to the following premises:

- The role of government in the United States is to provide essential public services that the private sector either cannot or will not provide; it is not the role of government to supplant the marketplace.
- The presumption in favor of market solutions to most public needs is based on a belief that the free interplay of forces of supply and demand produces the most desirable outcomes; this conviction derives not only from a preference for efficiency, but also from firmly rooted ideals concerning individual freedom and limits on authority.
- The Cold War was waged and won in large part to protect these principles; while it is true that national security sometimes demands deviations from the standards of limited government and market economics, such deviations should be permitted only when they are absolutely necessary.

Government maintenance depots and shipyards were not created to compete with private industry and the public-sector environment in which they currently operate cannot, and does not, allow normal market forces to work. Only by artificially manipulating the playing field can bids be solicited and evaluated, and a "winner" selected. In conventional economic terms, public-sector organizations distort the marketplace. Thrusting DoD depots and shipyards into competitions with industry compromises the very quality of the free market that makes it so useful as an honest arbiter of "value" -- fairness and objectivity.

The Task Force position, except for the Air Force, is that public depots should maintain only CORE capabilities and that workload not needed to maintain those capabilities should be accomplished in the private sector. The Task Force recommends discontinuing public-private competitions for non-CORE work³.

Issue 4. Surge and Mobilization Considerations – The role of surge and mobilization considerations in determining workload balance.

Mobilization describes a situation in which the nation's maximum effort is required to meet an external threat. Such situations typically arise following a Congressional declaration of war, which may include the granting of extraordinary power to the President to prepare for and prosecute the conflict. World War II was the last conflict in which a full-scale national mobilization occurred. However, throughout the Cold War, U.S. military plans envisioned the potential need for mobilization in order to cope with a Warsaw Pact invasion of Western Europe. Included in these plans was a requirement for a large and robust organic depot infrastructure.

The dissolution of the Soviet Union and gradual democratization of Eastern Europe greatly reduces the likelihood of another national mobilization at any time in the foreseeable future. No current contingency scenario approved by the Joint Chiefs of Staff anticipates a national mobilization, and the concept is therefore of limited utility in discussing the issue of current depot maintenance workloads. A more relevant concept is the notion of "partial mobilization" or "surge capability" in which weapon support is accelerated above normal peacetime levels in order to deal with a limited external threat.

One absolute in combat contingency planning is the tremendous uncertainty of industrial support requirements. In order to deal with this uncertainty and minimize the risk that mission-essential weapon systems will not be ready for combat, or, if employed, cannot be sustained in combat because of ineffective depot support, Service Secretaries work to ensure that the CINCs and subordinate operational commanders always have access to a ready and controlled source of the critical industrial products and services they need to fight and win.

Were cost no object, the Services would often, perhaps always, try to physically co-locate a full-service organic depot maintenance capability in the field with the operating combat units. Such an arrangement would provide extremely flexible and responsive combat surge support; it would also be extraordinarily expensive. To minimize risk at an affordable cost, each Service maintains an organic industrial support capability resident in its CONUS depots and shipyards. This capability is specifically tailored to the unique readiness and sustainability requirements of Service weapons and doctrine identified in current JCS combat contingency scenarios. Critical

³ Inevitably there will be circumstances when a public-private competition is required on an exception basis. In these cases, the Task Force believes the proposed competition must receive DDMC approval.

surge capabilities are protected during peacetime by the accomplishment of sufficient relevant depot workload to maintain artisan proficiency and to continuously verify the effectiveness, quality and safety of each Services' depot maintenance processes. The DoD CORE policy provides adjustment factors to fine tune surge capacity to real-world requirements (e.g. surge for a ship occurs during the post-conflict phase when full operational readiness for the next conflict is regained; for an aircraft engine, surge occurs during the conflict).

Private companies also possess the flexibility and capability needed to respond to a military emergency, and they have a proven record of reacting well to unanticipated requirements. It would be a mistake for Service logistics planners to underestimate industry's willingness to overlook the finer points of contract negotiation in the event of a true national emergency. As noted above, the only certainty in combat is uncertainty. It is in industry's interest to respond rapidly and efficiently to surge requirements. Expeditious response not only means more revenues, it also strengthens ties to the defense industry's principal customer. Industry has various options including changing its internal priorities, reassigning its personnel, and increasing its work shifts from one to three a day if the need calls for such action. But it is neither fair nor practical to demand that private companies sacrifice stability for flexibility and constantly be ready for the unexpected. Industry performs best when the business climate is predictable.

Depot surge capability is a critical element in the DoD CORE calculation methodology, and, thus central to the issue of workload balance. Surge support seeks to ensure that the Service depots and shipyards consistently maintain the capability and capacity needed to meet increased demands for depot industrial products and services resulting from the employment of mission essential weapons in support of a limited regional conflict. The ability to rapidly and successfully respond to surge requirements is a fundamental combat readiness and sustainability responsibility imposed by Title 10, USC and, therefore, a fundamental responsibility of the Service depots and shipyards.

Issue 5. Congressional Guidance – The role of Congressional guidance in determining workload balance.

Each year DoD is subjected to legislative guidance contained in annual appropriation and authorization acts. The most enduring of this congressional guidance is codified as permanent law in Title 10 United States Code (USC).

Title 10 USC Chapter 146, Contracting For Performance of Civilian Commercial Or Industrial Type Functions, is the basic law that prescribes the legal parameters for DoD acquisition activities including depot maintenance operations. The Chapter's nine sections, 2461 through 2469 address the following topics:

- 2461. Commercial or industrial type functions - required studies and reports before conversion to contractor performance
- 2462. Contracting for certain supplies and services required when cost is lower
- 2463. Reports on savings or costs from increased use of DoD civilian personnel
- 2464. CORE Logistics Functions
- 2465. Prohibition on contracts for performance of fire fighting or security-guard functions
- 2466. Limitations on the performance of depot-level maintenance of material
- 2467. Cost comparisons; requirements with respect to retirement costs and consultation with employees
- 2468. Military installations; authority of base commanders over contracting for commercial activities
- 2469. Contracts to perform workloads previously performed by depot-level activities of the Department of Defense; requirement of competition.

The discussion below deals only with those sections of Title 10 that have the most significant to depot maintenance.

2464. CORE LOGISTICS FUNCTIONS

Title 10 USC, Chapter 146, Section 2464 Sub-section (a)(1), requires DoD to maintain a logistics capability (including personnel, equipment, and facilities) to ensure a ready and controlled source of technical competence and resources necessary to ensure effective and timely response to a mobilization, national defense contingency situations and other emergency requirements. Sub-section (a)(2) specifies that the Secretary of Defense shall identify those logistics activities that are necessary to maintain the logistics capability described above. Sub-section (b)(1) precludes non-government personnel from contracting for performance of logistics activity identified by the Secretary under Subsection (a) above. Sub-section (b)(2) grants the Secretary of Defense waiver authority from Sub-section (b)(1) above and then requires that OMB Circular A-76 provisions be followed in case of such waiver. (OMB Circular A-76 establishes procedures for determining whether commercial activities should be performed under contract with commercial sources or in-house using Government facilities and personnel.) Sub-sections (b)(3) and (4) specify the provisions as to when the waiver under (b)(2) can take place and then elaborate on those provisions. (In summary, whenever a waiver is granted to non-government personnel to contract for performance of a logistic activity identified by the Secretary of Defense then the provisions of OMB Circular A-76 apply. If the analysis done to comply with A-76 indicates increased competition and increased private sector participation is necessary in order to perform DoD logistics functions in a more expeditious manner, then an exclusion from the OMB Circular A-76 provisions may be considered as a desirable recommendation.)

2466. LEGISLATIVELY DEFINED LIMITS

Title 10, USC, Section 2466 Sub-section (a)(1), prescribes the percentage limitation for the performance of depot-level maintenance. Except in the case of the Army, the Secretary of Defense may not contract for the performance by non-Federal Government personnel of more than 40% of depot-level maintenance workload for the military department or the Defense Agency. In the Army's case Sub-section (a)(2), the Secretary of the Army shall provide for the performance of Army aviation depot-level maintenance workload by employees of the Department of Defense of not less than (A) 50% for FY93, (B) 55% for FY94, and (C) 60% for FY95. Furthermore, sub-section (b) prohibits the management of DoD depot-level civilian employees on the basis of any end-strength constraint or limitation. Instead, these employees shall be managed solely on the basis of available workload and funds available for depot-level maintenance. Within the depot maintenance community this section is commonly referred to as the 60/40 split⁴.

Sub-section (c) grants the Secretaries of the Military Departments authority to waive the limitation requirements if warranted by national security interests. If the Secretaries exercise such waiver authority, they are required to notify Congress of the reasons. Sub-section (d) exempts the Sacramento Army Depot from the requirements of this section.

Reporting requirements are specified in Sub-section (e)(1); the Secretary of the Army and the Secretary of the Air Force shall jointly submit to the Congress a report describing the progress to achieve and maintain the percentage limitations by January 15, 1992 and 1993 for the then ended applicable fiscal years. Sub-section (e)(2) requires that the Secretary of each Military Department and the Secretary of Defense, with respect to the Defense Agencies, jointly submit by January 15, 1994, a report as described in Sub-section (e)(1).

The percentage limitation on the amount of contracting permitted, as specified in section 2466 above, presents a ceiling on the amount of depot-level work that Service Secretaries may place in the private sector (i.e., 40%). It is highly probable that this arbitrary balance of workload will be in conflict with the results of the Services' CORE calculations.

2469. THRESHOLD FOR MOVING WORKLOADS

Title 10 USC, Chapter 146, Section 2469 is the last section of the chapter. However, it is of major importance because it prescribes constraints and procedures placed on the Secretary of Defense or the Secretary of a military department. In essence, performance of depot-level maintenance workload with a threshold of

⁴ Section 343 of the FY94 Defense Authorization Bill reinforces the "60/40" requirement, stating that "...SecDef shall ensure that 2466 of title 10, USC is adhered to..."

\$3,000,000 that is currently being performed by a DoD depot-level activity cannot be changed, unless the Secretary uses competitive procedures⁵.

ACQUISITION LAW ADVISORY PANEL REPORT

In section 800 of Public Law Number 101-510 (the National Defense Authorization Act for FY91), Congress directed the Department of Defense to establish the "DoD Advisory Panel on Streamlining and Codifying Acquisition Laws." Accordingly the Under Secretary of Defense for Acquisition selected a Panel of experts in acquisition law and procurement policy to review all laws affecting DoD procurement with the intent of streamlining the acquisition processes. Under the leadership of the Commandant of the Defense Systems Management College, this panel concluded its work in January 1993 and prepared a report for transmission by the Secretary of Defense to the Congress. The report is commonly referred to as the 800 Report - named after the section of the law that authorized it. The report contains recommendations that impact on the distribution of depot work between the public and private sectors.

With regard to the three sections of Title 10, USC Chapter 146 on CORE Logistic Functions (Section 2464, 2466 and 2469), the panel proposed a new section designated as "24XY." The Task Force believes this recommendation should be adopted. Based on the Findings of the Defense Science Board Depot Maintenance Task Force Study, the following language is proposed:

"10 USC SECTION 24XY CORE LOGISTICS FUNCTIONS

- a. *POLICY - It is essential for the national defense that Department of Defense activities maintain a CORE logistics capability (including personnel, equipment and facilities) sufficient to ensure a ready and controlled source of technical competence and resources necessary for an effective and timely response to national defense contingency situations and other emergency requirements. Depot maintenance CORE is the capability maintained within organic Defense depots to meet readiness and sustainability requirements of the weapon systems that support the JCS contingency scenario(s). CORE exists to minimize operational risks and to guarantee required readiness for these weapon systems. CORE depot maintenance capabilities will comprise only the minimum facilities, equipment and skilled personnel necessary to ensure a ready and controlled source of required technical competence.*
- b. *Accordingly, the Secretary of Defense or secretary of a military department shall identify those logistics activities that are necessary to maintain the logistics capabilities described in subsection (a).*

⁵ Section 346 of the FY 1994 National Defense Authorization Act amended Section 2469 of Title 10, USC, so it only applies to shifts of work from organic to contract and to state that OMB Circular A-76 does not apply.

- (1) *Notwithstanding any other provision of law, the Secretary of Defense or secretary of a military department shall have the depot maintenance and repair of defense-related material performed at activities identified in subsection (b) as the secretary determines necessary to maintain the CORE logistics capabilities described in subsection (a).*
 - (2) *The Secretary of Defense or the secretary of a military department may relocate CORE workload from one military department to another. The Secretary may not use formal competitions among Government-owned facilities to determine which entity will perform CORE work.*
 - c. *In excess of depot maintenance workload required to preserve CORE capabilities described in subsection (a), above, the Secretary of Defense or secretary of a military department may acquire the additional modification, depot maintenance and repair of defense-related material and components, and the production of defense-related supplies, needed for the Department of Defense through (i) primarily competition among private firms, or (ii) occasionally competition between maintenance activities owned by the United States and private firms.*
 - d. *In competitions under this section, whether between DoD activities and private firms, or between private firms, bids from these entities shall accurately disclose all costs properly and consistently derived from accounting systems and practices that comply with laws, policies and standards applicable to those entities. In competition between DoD activities and private firms, the Government calculation for the cost of performance of such function by Department of Defense civilian employees shall be based on an estimate of the most efficient and cost effective organization for performance of such function by Department of Defense civilian employees.*
 - e. *The procedures or requirements of OMB Circular A-76 do not apply to determinations made or competitions entered into pursuant to this section."*

The final 800 panel recommendation in this area is the repeal of both Section 2466, and Section 2469. The replacement of these sections with the proposed new "Section 24XY" is strongly supported by the Task Force members, except for the Air Force.

CONCLUSION

A proper balance of depot maintenance workload between the public and private sectors of the defense industrial base will be achieved when the government depots and shipyards have reduced their workloads to the minimum required to protect critical CORE capabilities, and private companies have an opportunity to compete among themselves for everything else. In reality, there will always be workloads which industry cannot or will not compete for; in these cases it falls to the organic depots to act as "last sources of repair." Likewise, there will be occasional situations when a Service finds that there are insufficient qualified commercial bidders for a particular non-CORE workload, and a DoD depot may be asked to assume the workload or compete with industry on an exception basis. These inevitable anomalies do not change the basic strategy. The majority Task Force position is that public depots should concentrate on the work needed to protect their CORE capabilities, and that workload not needed to maintain those capabilities should be accomplished in the private sector. The Task Force, except for the Air Force, recommends discontinuing public-private competitions for non-CORE work. Similarly, the Task Force, except for the Air Force, believes DoD should use interservicing procedures, with Defense Depot Maintenance Council oversight, in lieu of public-public competition, for common hardware items requiring CORE capabilities.

**DOD DEPOT-LEVEL WEAPON SYSTEM SUPPORT
PRODUCTS AND SERVICES**

ATTACHMENT A to APPENDIX I

DoD Depot-level Weapon System Support Products and Services

- Scheduled and unscheduled rework/overhaul of major weapon systems (ships, aircraft, armored vehicles, guided missiles, etc.)
- Scheduled and unscheduled engine/power plant rework (includes main propulsion, auxiliary power, etc.)
- Scheduled and unscheduled repair/overhaul/refueling of operational military nuclear reactors
- Scheduled and unscheduled support equipment and test equipment rework (includes on-site test bench verification, calibration services, etc.)
- Scheduled weapon system component repair/rework (i.e., for wholesale distribution to the DoD supply system)
- Emergency weapon system component repair/rework ("repair and return" to operational customer, "work stoppage" condition on rework line, etc.)
- Tactical and non-tactical software support
- Emergency component fabrication/manufacturing based on drawings/specifications (i.e., not new design, not mass production for wholesale distribution)
- Emergency Support Equipment manufacturing based on drawings/specifications (i.e., not mass production for wholesale distribution)(includes depot-unique test benches, jigs, fixtures, stands, etc.)
- Weapon system modification design, engineering, hardware manufacturing and installation
 - *Modifications are changes made to a weapon or item of equipment which result in a new configuration, but which do not improve the weapon's capabilities.*
- Weapon system upgrade design, engineering, hardware manufacturing and installation
 - *Upgrades are changes made to a weapon or item of equipment which result in a new configuration, and which do improve the weapon's capabilities.*
- In-service engineering support to the operating forces (e.g. maintenance engineering, failure analysis/accident investigation, environmental engineering associated with maintenance processes, maintenance Examination & Evaluation (E&E) and Planner & Estimator (P&E) services, etc.)

APPENDIX J

DEPOT LEVEL FUNCTIONS SUITABLE FOR PERFORMANCE BY PUBLIC SECTOR AND PRIVATE SECTOR PERSONNEL

TASK 8: An identification of the depot-level functions and activities that are suitable for performance by employees of the Department of Defense and the depot-level functions and activities that are suitable for performance by non-federal government personnel.

APRIL 1994

**DEFENSE SCIENCE BOARD
DEPOT MAINTENANCE MANAGEMENT TASK FORCE**

TASK 8: An identification of the depot-level functions and activities that are suitable for performance by employees of the Department of Defense and the depot-level functions and activities that are suitable for performance by non-federal government personnel.

OVERVIEW

Based on inputs from all of the Services, DLA, the Joint Staff and private industry, the Task Force believes that a determination of what is "suitable" for performance by either employees of the federal government or by non-federal government personnel cannot be objectively made based on unique capabilities possessed by either the public or private sector, nor on any inherent cost/schedule/quality performance advantages. The Task Force found no data suggesting there are any depot maintenance functions or activities which could not be performed **equally well** by either employees of the Department of Defense or by non-federal government personnel working in the private sector. There is strong consensus that "suitability" in the context discussed here has no useful *qualitative* meaning. Therefore, absent this distinction, the question reduces to a subjective debate over the suitable *quantity* of depot-level functions and activities (i.e., workload) which should be performed by Government and non-Government employees.

DISCUSSION

The job of Government depot policy makers is risk management. Risk decreases in proportion to the number of different weapons the Service's logistics system is capable of supporting, or, conversely, the more capable the support infrastructure, the lower the operational risk. Guided by DoD policy, Service depot and shipyard commanders use their capabilities to ensure that timely and effective readiness and sustainability support is provided to the warfighter. There is a "critical mass" of capabilities below which risk is unacceptably high. DoD uses the term "CORE" to describe these minimum essential capabilities. It is the responsibility of each depot and shipyard commander to preserve and protect his CORE capabilities. He does this in peacetime by performing industrial work on weapons and equipment selected from among those that will be used by the CINCs in combat, in accordance with current JCS contingency scenarios. The *quantity* of depot-level functions and activities which is *suitably performed* by Government employees is, therefore, the *minimum needed to preserve* CORE capabilities. Since, in execution, the workload which is used to preserve a skill or competency will be selected from a pool of all items requiring that skill or competency, the Services have considerable discretion in deciding which workload is retained in the organic base. It is not necessary that a *specific* weapon system be retained, but rather that a capability relevant to that weapon system and/or technology be preserved. The purpose of the DoD CORE methodology is to guide the Services in selecting, from all possible depot workload opportunities, those products and services which

simultaneously preserve CORE *and* maximize mission essential weapon system operational readiness and sustainability.

CONCLUSION

Service depots and shipyards provide combat commanders with a level of responsiveness to inherently unpredictable contingency and warfighting requirements that cannot be practically achieved in the normal course of negotiated government-industry business relations. Therefore, some quantity of depot maintenance capability needs to be established and maintained in the organic base as essential for the national defense. This capability can only be preserved by accomplishing a suitable amount of workload. Emerging results of service CORE calculations indicate that about 45% of the total DoD depot workload must be retained in the organic base to preserve critical maintenance capabilities. This equates to approximately 82 million direct labor hours of workload per year.

The Task Force believes that all depot-level functions and activities which are *not* required to preserve CORE skills and capabilities should be made available to non-federal government personnel.

Although not specifically related to "suitability" from either a qualitative or quantitative standpoint, there is a depot-level function which the Task Force believes should be preferentially directed to the private sector: **weapon system modifications and upgrades**. This workload is unique among depot activities in the sense that it uses many of the same capabilities required by the commercial defense industry to design, develop and produce new weapon systems. For this reason, modification and upgrade work can potentially contribute to the viability of the defense technology base. A more detailed discussion of this subject is contained in Appendix I.

APPENDIX K

GLOSSARY

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**DEFENSE SCIENCE BOARD
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GLOSSARY

AD	Army Depot
AFMC	Air Force Materiel Command
AGMC	Aerospace Guidance and Metrology Center
ALC	Air Logistics Center
AMARC	Aerospace Maintenance and Regeneration Center
AMC	Army Materiel Command
ASARC	Army Acquisition Review Council
BRAC	Base Realignment and Closure
CAS	Cost Accounting Standards
CALS	Computer-aided Acquisition and Logistics Support
CBP	Corporate Business Plan
CINC	Commander-in-Chief
CINCDM	Commander-in-Chief of Depot Maintenance
CLS	Contractor Logistics Support
COTS	Commercial-off-the-shelf
DBOF	Defense Business Operations Fund
DCAA	Defense Contract Audit Agency
DCMC	Defense Contract Management Command
DDMA	Defense Depot Maintenance Agency
DDMC	Defense Depot Maintenance Council
DepSecDef	Deputy Secretary of Defense
DESCOM	Depot System Command
DLA	Defense Logistics Agency
DLH	Direct Labor Hour
DLR	Depot Level Reparable
DMA	Depot Maintenance Activity
DMBA	Defense Maintenance Business Area
DMI	Depot Maintenance Interservice
DMR	Defense Management Report
DMRD	Defense Management Report Decision
DMSP	Depot Maintenance Support Plan
DoD	Department of Defense
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
DTA	Decision Tree Analyses
DUSD	Deputy Under Secretary of Defense
DUSD(L)	Deputy Under Secretary of Defense (Logistics)
FAR	Federal Acquisition Regulation
FY	Fiscal Year

GFE	Government Furnished Equipment/Supplies
G & A	General and Administrative (Rates)
GOCO	Government-owned, Contractor-operated
GTE	Gas Turbine Engines
HASC	House Armed Services Committee
ICS	Interim Contractor Support
IFB	Invitation for Bid
IPE	Industrial Plant Equipment
IROAN	Inspect and Repair Only As Necessary
JCS	Joint Chiefs of Staff
JDMAG	Joint Depot Maintenance Analysis Group
JDMC	Joint Depot Maintenance Command
JLC	Joint Logistics Commanders
JPCG-DM	Joint Policy Coordinating Group on Depot Maintenance
LAV	Light Armored Vehicle
LCC	Life-Cycle Cost
LORA	Level of Repair Analysis
LSA	Logistics Support Analysis
MCLB	Marine Corps Logistics Base
MRC	Major Regional Conflict
MSA	Management Support Activity
MSC	Major Subordinate Command
MTBR	Mean Time Between Removal
NADEP	Naval Aviation Depot
NAVAIR	Naval Aviation Systems Command
NAVSEA	Naval Sea Systems Command
NDI	Non-developmental Item
NSWC	Naval Surface Warfare Center
NSY	Naval Shipyard
NUWC	Naval Underwater Warfare Center
NWC	Naval Warfare Center
NWS	Naval Weapons Station
OC-ALC	Oklahoma City Air Logistics Center
ODUSD(L)	Office of Deputy Under Secretary of Defense (Logistics)
O&M	Operations and Maintenance
OEM	Original Equipment Manufacturer
OPTEMPO	Operations Tempo

OSD	Office of the Secretary of Defense
POM	Program Objectives Memorandum
POS	Program Objectives Summary
RCM	Reliability-centered Maintenance
RDT&E	Research, Development, Test and Evaluation
SAAD	Sacramento Army Depot
SASC	Senate Armed Services Committee
SE	System Executive
SecDef	Secretary of Defense
SES	Senior Executive Service
SM-ALC	Sacramento Air Logistics Center
SOR	Source of Repair
SORDC	Source of Repair Decision Criteria
SOW	Statement of Work
SPAWAR	Space and Naval Warfare Systems Command
SWA	Southwest Asia
SYSCOM	System Command (Navy)
TOC	Theory of Constraints
TOR	Terms of Reference
TRANSCOM	Transportation Command
USA	United States Army
USAF	United States Air Force
U.S.C.	United States Code
USD(A)	Under Secretary of Defense (Acquisition)
USMC	United States Marine Corps
USN	United States Navy
WRSK	War Readiness Spares Kit